2014-2015 City of Lakeland Annual Stormwater Report

Prepared

September 2015

Tennessee Department of Environment and Conservation
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-8332 (TDEC)

Municipal Separate Storm Sewer System (MS4) Annual Report

1. MS4 INFORMATION

City of Lakeland, TN	TNS077526
Name of MS4	MS4 Permit Number
David Smith	dsmith@lakelandtn.org
Name of Contact Person	Email Address
(901) 867-2717	
Telephone (including area code)	
10001 U.S. Highway 70	
Mailing Address	

Lakeland	TN	38002
City	State	ZIP code

What is the current population of your MS4? 12950

What is the reporting period for this annual report? From July 1, 2014 to June 30, 2015

2. WATER QUALITY PRIORITIES (SECTION 3.1)

A. Does your MS4 discharge into waters listed as impaired on TN's most current 303(d) list and/or according to the on-line GIS mapping tool? ☒ Yes ☐ No

B. If yes, please attach a list all impaired waters within your jurisdictional area.

C. Does your MS4's jurisdictional area contain any water bodies where a TMDL has been approved for parameters other than pathogens, siltation and habitat alterations? If yes, please attach a list.

D. Does your MS4 discharge to any Exceptional TN Waters (ETWs) or Outstanding National Resource Waters (ONRWs)? If yes, please attach a list. ☐ Yes ☒ No

E. Are you implementing additional specific provisions to ensure the continued integrity of ETWs or ONRWS located within your jurisdiction? ☐ Yes ☒ No

3. PROTECTION OF STATE OR FEDERALLY LISTED SPECIES (SECTION 3.2.1 General Permit for Phase II MS4s)

A. Are there any state or federally listed species within the MS4's jurisdiction? ☐ Yes ☒ No

B. Are any of the MS4 discharges or discharge-related activities likely to jeopardize any state or federally listed species? ☐ Yes ☒ No

C. Please attach any authorizations or determinations by U.S. Fish & Wildlife Service on the effect of the MS4 discharges on state or federally listed species.

4. PUBLIC EDUCATION AND PUBLIC PARTICIPATION (SECTION 4.2.1 AND 4.2.2)

A. Have you developed a Public Information and Education plan (PIE)? ☒ Yes ☐ No

B. Is your public education program targeting specific pollutants and sources of those pollutants, such as Hot Spots? ☒ Yes ☐ No

C. If yes, what are the specific causes, sources and/or pollutants addressed by your public education program? construction site runoff, residential fertilizer, litter control, fecal coliforms

D. Note specific successful outcome(s) (NOT tasks, events, publications) fully or partially attributable to your public education program during this reporting period. The Adopt-a-Street program and Community Cleanup Day have allowed residents to clean up various parts of the city (see attachment 3 for data). Because of this, trash has been cleaned up and the public has become aware of issues litter can cause with stormwater.

E. Do you have an advisory committee or other body comprised of the public and other stakeholders that provides regular input on your stormwater program? ☐ Yes ☒ No

F. How do you facilitate, advertise, and publicize public involvement and participation opportunities? City newsletter, city website, email, signage, home owners associations

G. Do you have a webpage dedicated to your stormwater program? ☒ Yes ☐ No

If so, what is the link/URL: http://lakelandtn.gov/index.aspx?nid=144

H. Are you tracking and maintaining records of public education, outreach, involvement and participation activities? Please attach a summary of these activities. ☒ Yes ☐ No

5. Illicit Discharge Detection and Elimination (Section 4.2.3)

A. Have you completed a map of all outfalls and receiving waters of your storm sewer system? ☒ Yes ☐ No

B. Have you completed a map of all storm drain pipes of storm sewer system? ☒Yes ☐ No

C. How many outfalls have you identified in your system? 29

D. Have any of these outfalls been screened for dry weather discharges? ☒Yes ☐ No

F. What is your frequency for screening outfalls for illicit discharges? Approximately 20 percent each year

G. Do you have an ordinance that effectively prohibits illicit discharges? ☒ Yes ☐ No

H. During this reporting period, how many illicit discharges/illegal connections have you discovered (or been reported to you)? 0

I. Of those illicit discharges/illegal connections that have been discovered or reported, how many have been eliminated? 0

6. Construction Site Stormwater Runoff (Section 4.2.4)

A. Do you have an ordinance or adopted policies stipulating:

Erosion and sediment control requirements? ☒ Yes ☐ No

Other construction waste control requirements? ☒ Yes ☐ No

Requirement to submit construction plans for review? ☒ Yes ☐ No

MS4 enforcement authority? ☒ Yes ☐ No

B. How many active construction sites disturbing at least one acre were there in your jurisdiction this reporting period?7

C. How many of these active sites did you inspect this reporting period? 7

D. On average, how many times each, or with what frequency, were these sites inspected (e.g., weekly, monthly, etc.)? Twice monthly

E. Do you prioritize certain construction sites for more frequent inspections? ☐Yes ☒ No

If Yes, based on what criteria? N/A

7. PERMANENT STORMWATER CONTROLS (SECTION 4.2.5)

A. Do you have an ordinance or other mechanism to require:

Site plan reviews of all new and re-development projects?	☒ Yes	☐ No
Maintenance of stormwater management controls?	☒ Yes	☐ No
Retrofitting of existing BMPs with green infrastructure BMPs?	☐ Yes	☒ No

B What is the threshold for new/redevelopment stormwater plan review? (e.g., all projects, projects disturbing greater than one acre, etc.) All land disturbances

C. Have you implemented and enforced performance standards for permanent stormwater controls? ☒ Yes ☐ No

D. Do these performance standards go beyond the requirements found in Section 4.2.5.2 and require that pre-development hydrology be met for:

Flow volumes	☒ Yes	☐ No
Peak discharge rates	☒ Yes	☐ No
Discharge frequency	☐ Yes	☒ No
Flow duration	☐ Yes	☒ No

E. Please provide the URL/reference where all permanent stormwater management standards can be found.

Lakeland Stormwater Ordinance (Attachment 4), Lakeland Neighborhood Development Regulations (Attachment 4), Memphis-Shelby County Drainage Manual: http://www.stormwatermatters.com/Internal/Drainage.aspx

F. How many development and redevelopment project plans were reviewed for this reporting period? 4

G. How many development and redevelopment project plans were approved? 4

H. How many permanent stormwater management practices/facilities were inspected? 26

I. How many were found to have inadequate maintenance? 2

J. Of those, how many were notified and remedied within 30 days? (If window is different than 30 days, please specify) 2

K. How many enforcement actions were taken that address inadequate maintenance? 0

L. Do you use an electronic tool (e.g., GIS, database, spreadsheet) to track post-construction BMPs, inspections and maintenance? ☒ Yes ☐ No

M. Do all municipal departments and/or staff (as relevant) have access to this tracking system? ☒ Yes ☐ No

N. Has the MS4 developed a program to allow for incentive standards for redeveloped sites? ☐ Yes ☒ No

O. How many maintenance agreements has the MS4 approved during the reporting period? 0

8. CODES AND ORDINANCES REVIEW AND UPDATE (SECTION 4.2.5.3)

A. Is a completed copy of the EPA Water Quality Scorecard submitted with this report? ☒ Yes ☐ No

B. Include status of implementation of code, ordinance and/or policy revisions associated with permanent stormwater management. See Attachment 5

9. Stormwater Management for Municipal Operations (Section 4.2.6)

A. Have stormwater pollution prevention plans (or an equivalent plan) been developed for:

All parks, ball fields and other recreational facilities	☐ Yes	☒ No
All municipal turf grass/landscape management activities	☐ Yes	☒ No
All municipal vehicle fueling, operation and maintenance activities	☒ Yes	☐ No
All municipal maintenance yards	☒ Yes	☐ No
All municipal waste handling and disposal areas	☒ Yes	☐ No

B. Are stormwater inspections conducted at these facilities? ☒ Yes ☐ No

1. If yes, at what frequency are inspections conducted? annually

C. Have standard operating procedures or BMPs been developed for all MS4 field activities? (e.g., road repairs, catch basin cleaning, landscape management, etc.) ☒ Yes ☐ No

D. Do you have a prioritization system for storm sewer system and permanent BMP inspections? ☒ Yes ☐ No

E. On average, how frequently are catch basins and other inline treatment systems inspected? 20 percent of system inspected annually

F. On average, how frequently are catch basins and other inline treatment systems cleaned out/maintained? Catch basins in certain parts of Lakeland are maintained annually.

G. Do municipal employees in all relevant positions and departments receive comprehensive training on stormwater management? ☒ Yes ☐ No

H. If yes, do you also provide regular updates and refreshers? ☒ Yes ☐ No

If so, how frequently and/or under what circumstances? annually

10. Stormwater Management Program Update (Section 4.4)

A. Describe any changes to the MS4 program during the reporting period including but not limited to:

Changes adding (but not subtracting or replacing) components, controls or other requirements (Section 4.4.2.a). None

Changes to replace an ineffective or unfeasible BMP (Section 4.4.2.b). None

Information (e.g. additional acreage, outfalls, BMPs) on program area expansion based on annexation or newly urbanized areas. None

Changes to the program as required by the division (Section 4.4.3). None

11. Evaluating/Measuring Progress

A. What indicators do you use to evaluate the overall effectiveness of your Stormwater Management Program, how long have you been tracking them, and at what frequency? Note that these are not measurable goals for individual BMPs or tasks, but large-scale or long-term metrics for the overall program, such as in-stream macroinvertebrate community indices, measures of effective impervious cover in the watershed, indicators of in-stream hydrologic stability, etc.

Indicator	Began Tracking (year)	Frequency	Number of Locations
Example: E. coli	*2003*	*Weekly April–September*	*20*

Community Stormwater Survey	2011	Bi-Annual Survey (Next survey in Fall 2013)	Community Wide
Roadside Litter	2009	Weekly	Major Roads
Stormwater Manhole Insp.	2010	Annually	20% of manholes each year
Community Cleanup Days		Semi-Annually	Community Wide
Adopt-a-Street Program	2013	Every 3 months	Stewart Road, Beverle Rivera Drive

B. Provide a summary of data (e.g., water quality information, performance data, modeling) collected in order to evaluate the performance of permanent stormwater controls installed throughout the system. This evaluation may include a comparison of current and past permanent stormwater control practices. See attachments for community survey

12. ENFORCEMENT (SECTION 4.5)

A. Identify which of the following types of enforcement actions you used during the reporting period, indicate the number of actions, the minimum measure (e.g., construction, illicit discharge, permanent stormwater control) or note those for which you do not have authority:

Action	Construction	Permanent Stormwater Controls	Illicit Discharge	Authority?	
Notice of violation	#34	#___	#_____	☒ Yes	☐ No
Administrative fines	#_____	#___	#_____	☒ Yes	☐ No
Stop Work Orders	#7	#_____	#_____	☒ Yes	☐ No
Civil penalties	#_____	#_____	#_____	☒ Yes	☐ No
Criminal actions	#_____	#___	#_____	☐ Yes	☒ No
Administrative orders	#_____	#___	#_____	☐ Yes	☒ No
Other _____	#_____	#___	#_____		

B. Do you use an electronic tool (e.g., GIS, data base, spreadsheet) to track the locations, inspection results, and enforcement actions in your jurisdiction? ☒ Yes ☐ No

C. What are the 3 most common types of violations documented during this reporting period? Silt fences not being maintained properly, poor maintenance of ingress/egress, construction litter

13. PROGRAM RESOURCES (OPTIONAL)

A. What was your annual expenditure to implement the requirements of your MS4 NPDES permit and SWMP this past reporting period? $114,268

B. What is next year's budget for implementing the requirements of your MS4 NPDES permit and SWMP? $179,000

C. Do you have an independent financing mechanism for your stormwater program? ☒ Yes ☐ No

D. If so, what is it/are they (e.g., stormwater fees), and what is the annual revenue derived from this mechanism?

Source: Stormwater Fee Amount $179,000

Source: Amount $

E. How many full time employees does your municipality devote to the stormwater program (specifically for implementing the stormwater program vs. municipal employees with other primary responsibilities that dovetail with stormwater issues)? 0 – Activities for most of the reporting cycle were handled by a single full-time employee; however, they are now handled by consulting engineer. The City is planning to advertise to re-fill the position in late 2015.

F. Do you share program implementation responsibilities with any other entities? ☐ Yes ☒ No

Entity	Activity/Task/Responsibility	Your Oversight/Accountability Mechanism

G. Please attach a copy of your Organizational Chart

IT IS ATTACHED, ATTACHMENT #8.

14. CERTIFICATION

This report must be signed by a ranking elected official or by a duly authorized representative of that person. See signatory requirements in sub-part 6.7.2 of the permit.

"I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."

Jim Atkinson, City Manager — Printed Name and Title

Signature

11/12/15 — Date

Annual reports must be submitted in accordance with the requirements of Section 5.4. (Reporting) of the permit. Annual reports must be submitted to the appropriate Environmental Field Office (EFO) by September 30 of each calendar year, as shown in the table below:

EFO	Street Address	City	Zip Code	Telephone
Chattanooga	540 McCallie Avenue STE 550	Chattanooga	37402	(423) 634-5745
Columbia	1421 Hampshire Pike	Columbia	38401	(931) 380-3371
Cookeville	1221 South Willow Ave.	Cookeville	38506	(931) 432-4015
Jackson	1625 Hollywood Drive	Jackson	38305	(731) 512-1300
Johnson City	2305 Silverdale Road	Johnson City	37601	(423) 854-5400
Knoxville	3711 Middlebrook Pike	Knoxville	37921	(865) 594-6035
Memphis	8383 Wolf Lake Drive	Bartlett	38133	(901) 371-3000
Nashville	711 R S Gass Boulevard	Nashville	37216	(615) 687-7000

Attachment #1: List of Impaired Streams in Lakeland, TN

Final Version 2012 303(d) LIST (Loosahatchie River Basin cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010209 002 - 0300	SCOTTS CREEK	Shelby	7.2	Flow Alterations	NA	Upstream Impoundment	Category 4C. Impact not caused by a pollutant.
TN08010209 002 - 0400	OLIVER CREEK	Shelby	7.4	Total Phosphorus Loss of biological integrity due to siltation Escherichia coli	M L NA	Discharges from MS4 area Land Development	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 002 - 0500	BUCKHEAD CREEK	Shelby	14.59	Total Phosphorus Low Dissolved Oxygen Loss of biological integrity due to siltation Escherichia coli	M L L NA	Discharges from MS4 area Land Development	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 002 - 0700	HOWARD CREEK	Shelby	7.21	Total Phosphorus Escherichia coli	M NA	Discharges from MS4 area	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 002 - 1000	LOOSAHATCHIE RIVER	Shelby	10.3	Mercury Chlordane PCBs Dioxin Total Phosphorus Loss of biological integrity due to siltation Physical Substrate Habitat Alterations Escherichia coli	L NA NA NA M L L NA	Atmospheric Deposition Contaminated Sediment Discharges from MS4 area Land Development Channelization	Category 5. EPA approved PCB, dioxin, chlordane and pathogen TMDLs that address some of the known pollutants. EPA should take the lead on TMDLS involving atmospheric deposition.
TN08010209 002 - 2000	LOOSAHATCHIE RIVER	Shelby	8.2	Total Phosphorus Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L NA	Municipal Point Source Discharges from MS4 area Land Development Channelization	Category 5. The stream is impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 003 - 0200	CYPRESS CREEK	Shelby Fayette	13.67	Total Phosphorus Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L NA	Pasture Grazing Channelization	Category 5. Impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 003 - 1000	CLEAR CREEK	Shelby	2.67	Total Phosphorus Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L NA	Pasture Grazing Channelization	Category 5. Impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.

Attachment #2: Opinion of Endangered Wildlife Effects by MS4 Discharges in Lakeland, TN

The City of Lakeland has evaluated the effects of its storm water discharges, allowable non-storm water discharges and discharges related activities on state and federally listed species and critical habitat by referencing the listed species list published by the Tennessee Natural Heritage Program on the State of Tennessee web site as well as consultations with Mr. Allan Trently with TDEC and Mr. Robert Todd with TWRA. Copies of emails are following.

Email correspondence with Mr. Trently confirmed that no rare species have been observed within Lakeland boundaries.

Email correspondence with Mr. Todd express the opinion that the City of Lakeland current MS4 discharges will not jeopardize potential critical habitats or impact listed species.

Based upon these reviews and their consultations, we do not have reason to believe that the City of Lakeland discharges and/or discharge related activities will jeopardize or cause adverse impacts to listed species or destroy their critical habitats.

David Smith

From: Allan Trently <Allan.Trently@tn.gov>
Sent: Thursday, September 18, 2014 11:24 AM
To: David Smith
Subject: RE: Request for desktop review of stormwater impact to rare species

Categories: Filed by Newforma

Your request has been sent to DNA's data manager, Stephanie Whitaker. It is my understanding that there are no listed species within the proximity of the city. Stephanie will contact you if there are any additional questions or comments.

From: David Smith [mailto:davids@a2h.com]
Sent: Wednesday, September 17, 2014 10:05 AM
To: Allan Trently
Subject: Request for desktop review of stormwater impact to rare species

Mr. Trently,

I am working with the City of Lakeland in preparing their annual Stormwater Phase II program report. Under their municipal stormwater program permit (Section 3. Special Conditions 3.2 – Protection of State of Federally Listed Species), the city is to evaluate whether or not stormwater discharges, allowable non-stormwater discharges, and discharge related activities are likely to jeopardize the continued existence of any state or federally listed species, or result in the adverse modification or destruction of habitat that is designated as critical.

The City of Lakeland is not aware of any listed species within the proximity of the city. Therefore, I am emailing to confirm that assumption. I have enclosed the most recent list of rare species from the TDEC website and a map showing the location of the city.

Please let me know if there is any other information that you might need to determine the likely presence or absence of listed species within the city. This request must be sent annually, as per the permit, and last year Ms. Chelsea Broach issued a concurrence as to the absence of listed species.

Thank you for your time and attention to this.

David M. Smith, Ph.D., P.E.
Senior Civil Engineer - Manager

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901.372.0404 Fax: 901.373.4002
http://www.a2h.com

David Smith

From: Rob Todd <Rob.Todd@tn.gov>
Sent: Thursday, September 18, 2014 3:15 PM
To: David Smith
Subject: RE: Storm Water Discharges and their Impacts to Listed Species

Categories: Filed by Newforma

Mr. Smith:

The Tennessee Wildlife Resources Agency has revlewed the Information that you sent to us along with the information that was sent in 2013; and it is our opinion that the code, regulations, and ordinances that are currently in place to address stormwater issues within the jurisdiction of the City of Lakeland would not cause adverse impacts to listed species under our authority or destroy their critical habitats. Thank you for the opportunity to conduct this review. If I may be of further assistance, please contact me.

Robert Todd
Fish & Wildlife Environmentalist
Tennessee Wildlife Resources Agency
Ellington Agricultural Center
P.O. Box 40747
Nashville, TN 37204
Office: 615-781-6572
Cell: 931-881-8240
Fax: 615-781-6667
Email: rob.todd@tn.gov

From: David Smith [mailto:davids@a2h.com]
Sent: Thursday, September 18, 2014 8:25 AM
To: Rob Todd
Subject: Storm Water Discharges and their Impacts to Listed Species

Mr. Todd,

I am working with the City of Lakeland in preparing their annual report for their MS4 permit. I found in the file where Mr. Stuckert and you had corresponded by email in April 2013 regarding the efforts that the City of Lakeland has taken to minimize impacts of MS4 outfalls on receiving streams and those outfalls' effects on habitat.

The city is currently enforcing the regulations and ordinances as were submitted last year and are attached. Can you provide a concurrence email that states with these regulations in place stormwater discharges would not adversely modify for destroy critical habitats?

Thank you,

David M. Smith, Ph.D., P.E.
Senior Civil Engineer - Manager

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Help

Key to Status and Ranks

- Download Status and Ranks

Rare Species by County

Data Current as of April, 2014.

Go Rows 50 Actions

County = 'Shelby'

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County	Type	Category	Scientific Name	Common Name	Global Rank	State Rank	Fed. Status	State Status	Habitat	Wet Habitat Flag
Shelby	Vertebrate Animal	Fish	Noturus gladiator	Piebald Madtom	G3	S3	--	D	Large creeks & rivers in moderate-swift currents with clean sand or gravel substrates; Mississippi River tributaries.	Aquatic
Shelby	Vertebrate Animal	Fish	Ammocrypta beani	Naked Sand Darter	G5	S2	--	D	Shifting sand bottoms & sandy runs; Hatchie & Wolf rivers & their larger tribs.	Aquatic
Shelby	Vertebrate Animal	Mammal	Sorex longirostris	Southeastern Shrew	G5	S4	--	D	Various habitats including wet meadows, damp woods, and uplands; statewide.	Possible
Shelby	Vertebrate Animal	Mammal	Neotoma floridana illinoensis	Eastern Woodrat	G5T5	S3	--	D	Forested areas, caves & outcrops; west Tennessee generally.	Upland
Shelby	Vertebrate Animal	Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	G4T4	S3	--	T	Well-drained sandy soils in pine/pine-oak woods; dry mountain ridges; E portions of west TN, E to lower elev of the Appalachians.	Upland
Shelby	Vertebrate Animal	Amphibian	Acris gryllus	Southern Cricket Frog	G5	S2S3	--	--	Grassy margins of swamps, marshes, lakes, ponds, streams, ditches, and nearby temporary pools; far SW Tennessee.	Aquatic
Shelby	Vertebrate Animal	Amphibian	Hyla gratiosa	Barking Treefrog	G5	S3	--	D	Low wet woods and swamps esp. with ephemeral ponds.	Possible
Shelby	Vertebrate Animal	Bird	Ictinia mississippiensis	Mississippi Kite	G5	S2S3	--	D	Undisturbed stands of lowland and floodplain forests and along major rivers.	Aquatic
Shelby	Vertebrate Animal	Bird	Haliaeetus leucocephalus	Bald Eagle	G5	S3	--	D	Areas close to large bodies of water; roosts in sheltered	Aquatic

									sites in winter; communal roost sites common.	
Shelby	Vertebrate Animal	Bird	Sterna antillarum athalassos	Interior Least Tern	G4T2Q	S2S3B	LE	E	Mississippi River sand bars & islands, dikes. 	Aquatic
Shelby	Vertebrate Animal	Bird	Tyto alba	Barn Owl	G5	S3	--	D	Open and partly open country, often around human habitation; farms.	Upland
Shelby	Vertebrate Animal	Bird	Thryomanes bewickii	Bewick's Wren	G5	S1	--	E	Brushy areas, thickets and scrub in open country, open and riparian woodland.	Upland
Shelby	Vertebrate Animal	Bird	Vireo bellii	Bell's Vireo	G5	S1B	No Status	--	Thickets adjacent to water, bottomlands; west Tennessee and one confirmed location in Western Highland Rim.	Possible
Shelby	Vertebrate Animal	Bird	Dendroica cerulea	Cerulean Warbler	G4	S3B	--	D	Mature deciduous forest, particularly in floodplains or mesic conditions.	Upland
Shelby	Vertebrate Animal	Bird	Limnothlypis swainsonii	Swainson's Warbler	G4	S3	--	D	Mature, rich, damp, deciduous floodplain and swamp forests.	Possible
Shelby	Vertebrate Animal	Bird	Chondestes grammacus	Lark Sparrow	G5	S1B	--	T	Open habitats with scattered bushes and trees, prairie, cultivated areas, fields with bushy borders; ground nester.	Upland
Shelby	Vertebrate Animal	Fish	Cycleptus elongatus	Blue Sucker	G3G4	S2	--	T	Swift waters over firm substrates in big rivers.	Aquatic
Shelby	Invertebrate Animal	Mollusc	Lampsilis siliquoidea	Fatmucket	G5	S2	--	--	Slackwater with mud subst; Wolf R (Miss R trib); west TN; may occur at Reelfoot Lk; also rept Drakes Ck (Cumb R), Sumner Co.	Aquatic
Shelby	Invertebrate Animal	Mollusc	Obovaria jacksoniana	Southern Hickorynut	G2	S1	--	--	Rivers with medium-sized gravel substrates and low-mod current: Wolf & Hatchie rivers; Mississippi River watershed; west Tennessee.	Aquatic
Shelby	Invertebrate Animal	Insect	Lycaena hyllus	Bronze Copper	G5	S3	--	--	Marshes, sedge meadows, moist to wet grassy meadows, ditches, fens, streamside or pondshore wetlands, or roads and right of ways through marshlands. West TN.	Possible
Shelby	Invertebrate Animal	Mollusc	Webbhelix multilineata	Striped Whitelip	G5	S2	--	--	Low wet habitats, marshes, floodplains, meadows; lake margins; under leaf litter or drift; Mississippi River floodplain.	Possible
Shelby	Vascular Plant	Flowering Plant	Magnolia virginiana	Sweetbay Magnolia	G5	S2	--	T	Forested Acidic Wetlands	Possible
Shelby	Vascular Plant	Flowering Plant	Hottonia inflata	Featherfoil	G4	S2	--	S	Wet Sloughs And Ditches	Aquatic
Shelby	Vascular Plant	Flowering Plant	Schisandra glabra	Red Starvine	G3	S2	--	T	Rich Mesic Woods, Bluffs	Possible
Shelby	Vascular Plant	Flowering Plant	Ulmus crassifolia	Cedar Elm	G5	S2	--	S	Swamps	Possible

Shelby	Vascular Plant	Flowering Plant	Iris fulva	Copper Iris	G5	S2	--	T	Bottomlands	Possible
Shelby	Vascular Plant	Flowering Plant	Panax quinquefolius	American Ginseng	G3G4	S3S4	--	S-CE	Rich Woods	Possible
Shelby	No Data	Flowering Plant	Prenanthes crepidinea	Nodding Rattlesnake-root	G4	S3	--	W	Rich Bottomlands	Possible
Shelby	Vascular Plant	Flowering Plant	Symphyotrichum praealtum	Willow Aster	G5	S1	--	E	Moist Prairies And Marshes	Possible
Shelby	Vascular Plant	Flowering Plant	Silene ovata	Ovate Catchfly	G3	S2	--	E	Open Oak Woods	Upland
Shelby	Vascular Plant	Flowering Plant	Heteranthera multiflora	Multiflowered Mud-plantain	G4	S1	--	S	Shallow Water, Mud Flats	Possible
Shelby	Other (Ecological)	Heron Rookery	Heron rookery	Heron Rookery	GNR	SNR	--	--	No Data	No Data

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Description of Federal and State Ranks & Status Codes

GLOBAL RANK - The global or world-wide rank of a species which is a non-legal rank indicating the rarity and vulnerability of a species

G1	Extremely rare and critically imperiled in the world with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction
G2	Very rare and imperiled within the world, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction
G3	Rare and uncommon in its range or found locally in a restricted range, generally from 21-100 occurrences
G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern
G5	Demonstrably widespread and secure globally
GH	Of historical occurrence throughout its range, e.g. formally part of the established biota, with the expectation that it may be rediscovered
GU	Can not be ranked using available information
GX	Believed to be extirpated throughout its range
HYB	Hybrid within its range in Tennessee
SSYN	Synonym for another species
_Q	Questionable taxonomy (GRANKs only)
_T#	Subspecific taxon rank (GRANKs only)

STATE RANK - The state rank of a species in Tennessee. Like the G_rank this is a non-legal rank indicating the rarity and vulnerability of a species at the state level.

S1	Extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction
S2	Very rare and imperiled within the state, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction
S3	Rare and uncommon in the state, from 21-100 occurrences
S4	Widespread, abundant, and apparently secure within the state, but with cause for long-term concern
S5	Demonstrably widespread and secure in the state
SH	Of historical occurrence in Tennessee, e.g. formally part of the established biota, with the expectation that it may be rediscovered
SU	Can not be ranked using available information
SX	Believed to be extirpated from the state
S#S#	Denotes a "range rank" because the rarity of the species is uncertain (e.g. S1S3)
S?, S_?	Unranked at this time or rank uncertain
SE	Exotic species established in the state
SE#	Exotic numeric (e.g. the Asian clam *Corbicula fluminea* would be SE5)
SP	Potentially occurring in Tennessee, but not yet documented by DNH
_N	Occurs in Tennessee in a non-breeding status (mostly applies to vertebrates)

Description of Federal and State Ranks & Status Codes

_B	Breeds in Tennessee
SA	Accidental or casual in the state (several birds)
SR	Reported from the state, but insufficient data to assign rank
SRF	Reported falsely from the state
HYB	Hybrid within its range in Tennessee
SSYN	Synonym for another species
_Q	Questionable taxonomy (GRANKs only)
_T#	Subspecific taxon rank (GRANKs only)

FEDERAL STATUS - The federal listing under the U.S. Endangered Species Act

LE, Listed Endangered	Taxon is threatened by extinction throughout all or a significant portion of its range
E/SA,Endangered by Similarity of Appearance	Taxon is treated as an endangered species because it may not be easily distinguished from a listed species
LT, Listed Threatened	Taxon is likely to become an endangered species in the foreseeable future
T/SA,Threatened by Similarity of Appearance	Taxon is treated as a threatened species because it may not be easily distinguished from a listed species
PE, Proposed Endangered	Taxon proposed for listing as endangered
PT, Proposed Threatened	Taxon proposed for listing as threatened
C, Candidate species* **	Taxon for which the USFWS has sufficient information to support proposals to list the species as threatened or endangered, and for which the Service anticipates a listing proposal
(PS) Partial Status (based on taxonomy)	Taxon which is listed in part of its range, but for which Tennessee subspecies are not included in the Federal designation
(PS:status) Partial Status (based on political boundaries)	Taxon which is listed in part of its range, but for which Tennessee populations are not included in the Federal designation e.g. (PS:LE)
(XN) Non-essential experimental population in portion of range	Taxon which has been introduced or re-introduced in an area from which it has been extirpated, and for which certain provisions of the Act may not apply

Description of Federal and State Ranks & Status Codes

STATE STATUS -The legal listing in Tennessee

E, Endangered	Any species or subspecies whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so within the foreseeable future
T, Threatened	Any species or subspecies that is likely to become an endangered species within the foreseeable future
D, Deemed in Need of Management	Any species or subspecies of nongame wildlife which the executive director of the TWRA believes should be investigated in order to develop information relating to populations, distribution, habitat needs, limiting factors, and other biological and ecological data to determine management measures necessary for their continued ability to sustain themselves successfully. This category is analogous to "Special Concern."
S, Special Concern	Any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status.

Additional Modifiers for Plants

PE, Proposed Endangered	Any species or subspecies of plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee's endangered species. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.
PT, Proposed Threatened	Any species or subspecies of a plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee threatened species. After a public hearing, these plants will formally become State threatened.
E-PT, Endangered-Proposed Threatened	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down-listed to threatened. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State threatened.
E-PS, Endangered Proposed Special Concern	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down-listed to special concern. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State special concern.
T-PE, Threatened Proposed Endangered	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be listed on the state endangered list. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.

Description of Federal and State Ranks & Status Codes

T-PS, Threatened Proposed Special Concern	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be down-listed to special concern. After a public hearing, these plants will formally become State special concern.
P, Possibly Extirpated	Species or subspecies that have not been seen in Tennessee for the past 20 years. May no longer occur in Tennessee.
C, Commercially Exploited	Due to large numbers being taken from the wild and propagation or cultivation insufficient to meet market demand. These plants are of long-term conservation concern, but the Division of Natural Heritage does not recommend they be included in the normal environmental review process.

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010208 896 - 1000	TOWN CREEK	Tipton	11.3	Low Dissolved Oxygen Total Phosphorus Loss of biological integrity due to siltation Physical Substrate Habitat Alterations Escherichia coli	L M L L H	Undetermined Source Nonirrigated Crop Production Urbanized high Density Area Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010208 1866 - 1000	CARTER CREEK	Haywood	6.4	Physical Substrate Habitat Alterations Alteration in stream-side or littoral vegetative cover Escherichia coli	L L H	Nonirrigated Crop Production Channelization Source Unknown	Stream is Category 5. (One or more uses impaired.)

Loosahatchie River Basin

This basin contains the following USGS Hydrologic Unit Codes: 08010209 (Loosahatchie River).

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010209 001 - 0100	TODD BRANCH	Shelby	4.9	Low Dissolved Oxygen Physical substrate Habitat Alterations Total Phosphorus Escherichia coli	L L M NA	Discharges from MS4 area Channelization Collection System Failure	Category 5, impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 001 - 1000	LOOSAHATCHIE RIVER	Shelby	7.8	Mercury PCBs Dioxins Chlordane Loss of biological integrity due to siltation Physical Substrate Habitat Alterations Total Phosphorus Escherichia coli	L NA NA NA L L M NA	Atmospheric Deposition Discharges from MS4 area Contaminated Sediment Channelization	Fishing advisory originally due to chlordane. Category 5. EPA approved PCB, dioxin, chlordane and pathogen TMDLs that address some of the known pollutants. EPA should take the lead on TMDLS involving atmospheric deposition.
TN08010209 002 - 0100	UNNAMED TRIB TO LOOSAHATCHIE RIVER	Shelby	4.95	Escherichia coli	NA	Discharges from MS4 area	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010209 002 - 0200	ROCKY BRANCH	Shelby	6.62	Escherichia coli	NA	Discharges from MS4 area	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.

Final Version 2012 303(d) LIST (Loosahatchie River Basin cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010209 002 - 0300	SCOTTS CREEK	Shelby	7.2	Flow Alterations	NA	Upstream Impouncment	Category 4C. Impact not caused by a pollutant.
TN08010209 002 - 0400	OLIVER CREEK	Shelby	7.4	Total Phosphorus Loss of biological integrity due to siltation Escherichia coli	M L NA	Discharges from MS4 area Land Development	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 002 - 0500	BUCKHEAD CREEK	Shelby	14.59	Total Phosphorus Low Dissolved Oxygen Loss of biological integrity due to siltation Escherichia coli	M L L NA	Discharges from MS4 area Land Development	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 002 - 0700	HOWARD CREEK	Shelby	7.21	Total Phosphorus Escherichia coli	M NA	Discharges from MS4 area	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 002 - 1000	LOOSAHATCHIE RIVER	Shelby	10.3	Mercury Chlordane PCBs Dioxin Total Phosphorus Loss of biological integrity due to siltation Physical Substrate Habitat Alterations Escherichia coli	L NA NA NA M L L NA	Atmospheric Deposition Contaminated Sediment Discharges from MS4 area Land Development Channelization	Category 5. EPA approved PCB, dioxin, chlordane and pathogen TMDLs that address some of the known pollutants. EPA should take the lead on TMDLS involving atmospheric deposition.
TN08010209 002 - 2000	LOOSAHATCHIE RIVER	Shelby	8.2	Total Phosphorus Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L NA	Municipal Point Source Discharges from MS4 area Land Development Channelization	Category 5. The stream is impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 003 - 0200	CYPRESS CREEK	Shelby Fayette	13.67	Total Phosphorus Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L NA	Pasture Grazing Channelization	Category 5. Impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 003 - 1000	CLEAR CREEK	Shelby	2.67	Total Phosphorus Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L NA	Pasture Grazing Channelization	Category 5. Impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.

Final Version 2012 303(d) LIST (Loosahatchie River Basin cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010209 004 – 0100	BLACK ANKLE CREEK	Fayette	27.0	Low Dissolved Oxygen Total Phosphorus Loss of biological integrity due to siltation Escherichia coli	L M L NA	Nonirrigated Crop Production Land Development Undetermined Source	Stream is Category 5. . EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 004 – 1000	LOOSAHATCHIE RIVER	Shelby Fayette	10.0	Physical Substrate Habitat Alterations	L	Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010209 007 – 1000	LOOSAHATCHIE RIVER	Fayette	9.6	Physical Substrate Habitat Alterations Escherichia coli	L NA	Channelization Undetermined Source	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 008 – 1000	TREADVILLE BOTTOM	Fayette	32.16	Escherichia coli	NA	Undetermined Source	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010209 010 – 1000	JONES CREEK	Fayette	36.9	Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	L L NA	Nonirrigated Crop Production Undetermined Source	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 011 – 1000	LOOSAHATCHIE RIVER	Fayette	5.8	Physical Substrate Habitat Alterations	L	Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010209 011 – 2000	LOOSAHATCHIE RIVER	Fayette	14.1	Physical Substrate Habitat Alterations	L	Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010209 014 – 1000	LAUREL CREEK	Fayette	38.2	Total Phosphorus Low Dissolved Oxygen Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L L NA	Nonirrigated Crop Production Channelization Undetermined Source	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 015 – 1000	LITTLE CYPRESS CREEK	Fayette	17.14	Total Phosphorus Low Dissolved Oxygen Physical Substrate Habitat Alterations	M L L	Nonirrigated Crop Production Channelization	This stream is Category 5. The stream is impaired for one or more uses.
TN08010209 016 – 0100	WEST BEAVER CREEK	Shelby Tipton	30.95	Low Dissolved Oxygen Total Phosphorus Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	L M L L	Nonirrigated Crop Production Channelization	This stream is Category 5. The stream is impaired for one or more uses.

Final Version 2012 303(d) LIST (Loosahatchie River Basin cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010209 016 – 0200	MIDDLE BEAVER CREEK	Tipton	65.37	Low Dissolved Oxygen Total Phosphorus Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	L M L L	Nonirrigated Crop Production Channelization	This stream is Category 5. The stream is impaired for one or more uses.
TN08010209 016 – 0210	KELLY CREEK	Tipton	16.67	Escherichia coli	NA	Pasture Grazing	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010209 016 – 0300	EAST BEAVER CREEK	Tipton Fayette	84.5	Low Dissolved Oxygen Nitrate+Nitrite Total Phosphorus Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	L M M L L	Nonirrigated Crop Production	This stream is Category 5. The stream is impaired for one or more uses.
TN08010209 016 – 0310	BAXTER BOTTOM	Tipton	37.99	Physical Substrate Habitat Alterations	L	Channelization	Category 5. The stream is impaired for one or more uses.
TN08010209 016 – 1000	BEAVER CREEK	Shelby	30.38	Total Phosphorus Low Dissolved Oxygen Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	M L L L	Nonirrigated Crop Production Channelization	Category 5. The stream is impaired for one or more uses.
TN08010209 021 – 0100	JAKES CREEK	Shelby	22.8	Total Phosphorus Loss of biological integrity due to siltation Escherichia coli	M L NA	Nonirrigated Crop Production Undetermined Source	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 021 – 0110	BEAR CREEK	Shelby Tipton	14.5	Total Phosphorus Low Dissolved Oxygen Escherichia coli	M L NA	Nonirrigated Crop Production Pasture Grazing	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 021 – 0200	ROYSTER CREEK	Shelby Tipton	37.4	Total Phosphorus Low Dissolved Oxygen Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	M L L L NA	Nonirrigated Crop Production Channelization Pasture Grazing	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.

Final Version 2012 303(d) LIST (Loosahatchie River Basin cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010209 021 – 0300	NORTH FORK CREEK	Shelby Tipton	37.6	Total Phosphorus Low Dissolved Oxygen Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	M L L L NA	Nonirrigated Crop Production Channelization Discharges from MS4 area	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 021 – 0600	CROOKED CREEK CANAL	Shelby	31.21	Total Phosphorus Low Dissolved Oxygen Physical Substrate Habitat Alteration Escherichia coli	M L L NA	Nonirrigated Crop Production Channelization Discharges from MS4 area	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 021 – 1000	BIG CREEK	Shelby	8.33	Low Dissolved Oxygen Nitrate + Nitrite Total Phosphorus Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	L M M L L NA	Discharges from MS4 area Municipal Point Source Channelization	Category 5. The stream is impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 021 – 2000	BIG CREEK	Shelby	6.25	Low Dissolved Oxygen Total Phosphorus Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	L M L L NA	Discharges from MS4 area Channelization	Category 5. The stream is impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010209 021 – 3000	BIG CREEK	Shelby Tipton	27.75	Total Phosphorus Low Dissolved Oxygen Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	M L L L NA	Nonirrigated Crop Production Channelization Discharges from MS4 area	Category 5. EPA approved a pathogen TMDL that addresses one of the known pollutants.
TN08010209 021 – 4000	BIG CREEK	Tipton	35.1	Escherichia coli	NA	Undetermined Source	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.

Wolf River Basin This basin contains the following USGS Hydrologic Unit Codes: 08010210 (Wolf River).

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010210 001 – 0100	HARRINGTON CREEK	Shelby	16.5	Arsenic Total Phosphorus Low dissolved oxygen Escherichia coli	M M L NA	Discharges from MS4 area	Category 5. Impaired, but EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 001 – 0200	HARRISON CREEK	Shelby	4.6	Physical Substrate Habitat Alteration Escherichia coli	L NA	Discharges from MS4 area	Category 5. EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 001 - 0300	WORKHOUSE BAYOU	Shelby	3.7	Physical Substrate Habitat Alteration Alteration in stream-side or littoral vegetative cover Total Phosphorus Escherichia coli	L L M NA	Discharges from MS4 area	Category 5. Impaired, but EPA has approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 001 – 1000	WOLF RIVER	Shelby	12.8	Total Phosphorus Mercury Lead Chlordane PCBs Dioxin Loss of biological integrity due to siltation Escherichia coli	M L H NA NA NA L NA	Atmospheric Deposition Discharges from MS4 area RCRA Hazardous Waste Site Channelization Contaminated sediments	Fishing advisory. Category 5. EPA approved PCB, chlordane dioxin, and pathogen TMDLs that address some of the known pollutants. EPA should take the lead on TMDLS involving atmospheric deposition.
TN08010210 002 – 0100	SWEETBRIAR CREEK	Shelby	2.5	Physical Substrate Habitat Alterations	L	Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010210 002 – 1000	WOLF RIVER	Shelby	6.3	Mercury Chlordane PCBs Dioxin Loss of biological integrity due to siltation	L NA NA NA L	Atmospheric Deposition Contaminated Sediments Channelization Discharges from MS4 area	Fishing advisory. Category 5. EPA approved PCB, dioxin, and chlordane TMDLs that address some of the known pollutants. EPA should take the lead on TMDLs involving atmospheric deposition.
TN08010210 002 – 2000	WOLF RIVER	Shelby	3.8	Loss of biological integrity due to siltation	L	Channelization Discharges from MS4 area	Category 5.
TN08010210 003 – 0100	JOHNSON CREEK	Shelby Fayette	10.4	Alteration in stream-side or littoral vegetative cover	L	Discharges from MS4 Area Pasture Grazing	Category 4A. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010210 004 – 0400	UNNAMED TRIB TO WOLF RIVER	Fayette	12.0	Total Phosphorus Escherichia coli	M NA	Pasture Grazing	Category 4A. EPA approved a pathogen TMDL that addresses the known pollutant.

Final Version 2012 303(d) LIST (Wolf River Basin cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority	Pollutant Source	COMMENTS
TN08010210 004 – 0410	UNNAMED TRIB TO THE UNNAMED TRIB TO WOLF RIVER	Fayette	11.6	Alteration in stream-side or littoral vegetative cover L	Pasture Grazing	Category 4A. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010210 004 – 0500	RUSSELL CREEK	Fayette	12.8	Alteration in stream-side or littoral vegetative cover L Physical Substrate Habitat Alterations L Escherichia coli NA	Nonirrigated Crop Production Channelization Pasture Grazing	Category 4A. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010210 005 - 0100	TEAGUE BRANCH	Fayette	17.0	Physical Substrate Habitat Alterations L Escherichia coli NA	Pasture Grazing	This stream is Category 5. The stream is impaired for one or more uses.
TN08010210 005 - 0200	STOUT CREEK	Fayette	6.7	Physical Substrate Habitat Alterations L Low dissolved oxygen L	Pasture Grazing Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010210 005 - 1000	GRISSUM CREEK	Fayette	17.9	Physical Substrate Habitat Alterations L Low dissolved oxygen L Escherichia coli NA	Pasture Grazing Channelization	Category 5. EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 019 - 0300	MOODY CREEK	Hardeman	3.1	Flow Alteration NA	Upstream Impoundment	Poor quality releases from Indian Creek Lake #8. Category 4c. Impact not caused by a pollutant.
TN08010210 020 – 0400	MCKINNIE CREEK	Fayette Hardeman	35.1	Low Dissolved Oxygen L Escherichia coli NA	Pasture Grazing	Category 5. Approved pathogen TMDL addresses some of the known pollutants.
TN08010210 020 – 0410	MAY CREEK	Fayette Hardeman	27.1	Escherichia coli NA	Pasture Grazing	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010210 020 – 0500	NORTH FORK CREEK	Fayette Hardeman	39.0	Escherichia coli NA	Pasture Grazing	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010210 021 – 0100	ALEXANDER CREEK	Fayette	21.8	Low Dissolved Oxygen L	Pasture Grazing	Category 5. Approved pathogen TMDL addresses some of the known pollutants.
TN08010210 021 - 1000	SHAWS CREEK	Fayette	20.1	Low dissolved oxygen L Escherichia coli NA	Undetermined Source Pasture Grazing	Category 5. Approved pathogen TMDL addresses some of the known pollutants.

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority	Pollutant Source	COMMENTS
TN08010210 022 - 0100	UNNAMED TRIB TO GRAYS CREEK	Shelby	8.4	Loss of biological integrity due to siltation L Physical Substrate Habitat Alteration L Total Phosphorus M Low Dissolved Oxygen L Escherichia coli NA	Discharges from MS4 area	Category 5. Impaired, but EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 022 - 0300	MARYS CREEK	Shelby	17.4	Loss of biological integrity due to siltation L Total Phosphorus M Low dissolved oxygen L Escherichia coli NA	Discharges from MS4 Area Upstream Impoundment	Category 5. Impaired, but EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 022 - 0350	MARYS CREEK	Shelby Fayette	2.5	Flow Alteration NA Escherichia coli NA	Upstream Impoundment Pasture Grazing	Mary's Creek impacted below Herb Parson's Lake. Category 4A. EPA approved a pathogen TMDL that addresses the known pollutant. Flow alteration is 4c.
TN08010210 022 - 1000	GRAYS CREEK	Shelby Fayette	15.8	Total Phosphorus M Low Dissolved Oxygen L Physical Substrate Habitat Alterations L Loss of biological integrity due to siltation L Escherichia coli H	Discharges from MS4 Area Nonirrigated Crop Production Channelization	Stream is Category 5. (One or more uses impaired.)
TN08010210 023 – 0100	UNNAMED TRIB TO FLETCHER CREEK	Shelby	23.1	Arsenic H Alteration in stream-side or littoral vegetative cover L Physical Substrate Habitat Alteration L Escherichia coli NA	Discharges from MS4 area Channelization	Category 4a. EPA approved a pathogen TMDL that addresses the known pollutant.
TN08010210 023 – 0200	UNNAMED TRIB TO FLETCHER CREEK	Shelby	6.5	Alteration in stream-side or littoral vegetative cover L Low Dissolved Oxygen L Total Phosphorus M Escherichia coli NA	Discharges from MS4 area Pasture Grazing Livestock Feeding Operations	Category 5. EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 023 – 1000	FLETCHER CREEK	Shelby	10.7	Arsenic H Low Dissolved Oxygen L Total Phosphorus M Physical Substrate Habitat Alterations L Escherichia coli NA	Pasture Grazing Discharges from MS4 area Channelization	Category 5. The stream is impaired for one or more uses, however EPA has approved a pathogen TMDL that addresses some of the known pollutants.

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010210 032 - 1000	CYPRESS CREEK	Shelby	8.6	PCBs Aldrin Dieldrin Endrin DDT Chlordane Lead Low Dissolved Oxygen Total Phosphorus Physical Substrate Habitat Alterations Escherichia coli	L L L L L L H L L L NA	Contaminated Sediment Collection System Failure Discharges from MS4 area Channelization	Some sections of Cypress Creek concreted. Category 5. Impaired, but EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010210 032 - 2000	CYPRESS CREEK	Shelby	5.0	PCBs Low Dissolved Oxygen Total Phosphorus Physical Substrate Habitat Alterations Escherichia coli	L L M L NA	Contaminated Sediment Collection System Failure Discharges from MS4 area Channelization	Most of upper Cypress Creek concreted. Category 5. Impaired, but EPA approved a pathogen TMDL that addresses some of the known pollutants.

Nonconnah Creek Basin

This basin contains the following USGS Hydrologic Unit Codes: 08010211 (Nonconnah Creek).

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN08010211 001 – 0100	HORN LAKE CUTOFF	Shelby	16.4	Low Dissolved Oxygen Total Phosphorus Loss of biological integrity due to siltation Arsenic Escherichia coli	L M L H NA	Discharges from MS4 area	This stream is Category 5. EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010211 001 – 1000	HORN LAKE CREEK	Shelby	10.3	Low Dissolved Oxygen Loss of biological integrity due to siltation Escherichia coli	L L NA	Discharges from MS4 area	This stream is Category 5. EPA approved a pathogen TMDL that addresses some of the known pollutants.
TN08010211 001 – 2000	HORN LAKE CREEK	Shelby	5.2	Low Dissolved Oxygen Loss of biological integrity due to siltation Arsenic Escherichia coli	L L H NA	Sources Outside of State Land Development	Category 5. EPA approved a pathogen TMDL that addresses some of the known pollutants. TMDLs for pollution sources outside of Tennessee should be done by Mississippi or EPA.

Attachment #3: Public Education, Outreach, Involvement, and Participation Activities

- Monthly Stormwater Board of Appeals Meetings
- Lakeland has become a member of Keep America Beautiful, opening up additional education opportunities
- Waterway Crossing Signs, December 2014
    - Public Works installed and replaced signs at all named creek crossings within the city limits.
- Green Development Grant, August 2014
    - The city applied for a green development grant through TDEC, TNSA, TDOT, and TVA for installation of rain gardens and funding for community workshops
- Lakeland Fall Community Cleanup Day Saturday, November 8, 2014
- Lakeland Spring Community Cleanup Day Saturday, May 2, 2015
- Adopt-A-Street Program: Each group picks up roadside litter 4 times per year

Attachment #4: Lakeland Stormwater Ordinance-Chapter 6, Section 18

Neighborhood Development Regulations for Stormwater Management in Lakeland

Attachment #7: Water Quality Survey

2011 Stormwater Runoff and Water Quality Survey

Final Report

Submitted to:

The City of Lakeland, Tennessee

etc Institute

725 W. Frontier
Olathe, KS 66061
(913) 829- 1215

June, 2011

2011 Lakeland Stormwater Survey
Executive Summary

Purpose and Methodology

Purpose. The City of Lakeland conducted a stormwater management survey during May of 2011. The purpose of the survey was to identify stormwater issues affecting Lakeland as part of the City's ongoing effort to involve citizens in the issues and solutions for stormwater management.

Method of Administration. A four-page survey was administered over the telephone to a random sample of 416 households in Lakeland. The overall results for Lakeland have a precision of at least +/4.7% at the 95% level of confidence.

Major Findings

Relative Importance of Water Quality to Other Issues Affecting Residents In Lakeland
Residents were asked to rate the level of importance of several issues affecting residents of the City. The findings are described below:

- Of the issues assessed on the survey, 99% of residents felt the quality of life for children and families was "very" or "somewhat important"; 98% felt that safety from crime in neighborhoods was important, and 97% felt that maintaining property value was important.

- The top three issues that residents felt should receive the most emphasis by City leaders were 1) safety from crime in neighborhoods, 2) quality of education (K-12), and 3) quality of life for children and families.

- Compared to other City priorities 59% (up from 56% in 2008) of those surveyed thought it was "very important" to maintain and protect streams and stream corridors in Lakeland, 36% felt it was "somewhat important", 4% felt it was not important, and 2% were not sure.

Perception of Water Resources
Residents were asked various questions regarding the water quality in the area where they lived. Some of the findings are listed below:

- Residents were asked to rate the level of concern about pollution in streams and rivers in the Lakeland area. Forty percent (40%) of those surveyed were "very concerned", 36% were "somewhat concerned" and 20% were "not concerned". Four Percent (4%) were "not sure".

- When residents were asked where stormwater goes after it enters a storm drain, over one-third (35%) of residents thought it went directly into creeks and rivers without treatment, 3% thought it went into the creeks and rivers after treatment, 11% thought it went to a treatment plant and 51% did not know.

- When asked about the location of their property relative to a watershed, 15% said they lived inside a watershed, 16% live near a watershed, 25% said they lived outside of a watershed, and 44% did not know.

Taking Personal Responsibility for Issues that Affect Water Quality and the Environment
Respondents were asked several questions that addressed personal responsibility for issues affecting stormwater and water quality. The findings are described below:

- Over half (54%) of residents indicated they could affect the quality of water in streams and rivers; 30% did not feel that their actions could affect water quality and 16% did not know.

- Of those residents who currently participate in activities to help the environment, 75% took hazardous waste to the Waste site, 70% landscaped their yard with native plants, and 69% washed their car on the lawn/grass instead of the street or driveway.

- For those residents who did not currently participate in activities to help the environment, 71% were willing to take hazardous waste to a Waste site, 53% were willing to pick up trash along rivers and streams, and 50% were willing to wash their cars on the lawn/grass instead of the street or driveway.

Stormwater and Water Quality Information
Participants were asked several questions that addressed the stormwater and water quality information they currently receive. The findings are described below:

- Twenty-one percent (21%) of residents indicated they received information about water quality and stormwater from newspapers, magazines or print media during the past year, 12% indicated they received information from television stories/ads, 6% received information from the Internet or City website, and 6% received information from brochures. **Trends** The information about water quality showed a significant decrease from 2008 in all six categories. Areas that showed the most significant decrease were newspaper, magazines, and print media (-14%), brochures (-9%), and internet and City website (-5%).

- The top four ways residents preferred to receive information about stormwater and water quality were from 1) newspapers, magazines or other print media (39%), 2) television stories/ads (28%), 3)Internet or City website (27%), and 4) Brochures (17%).

- Twenty-eight percent (28%) of those surveyed felt they were more aware of water quality issues compared to two years ago; 65% felt they had the same level of awareness, 4% were less aware, and 3% of residents indicated this question did not apply to them because they did not live in the area two years ago.

Perceived Impact of Various Activities on Water Quality
Residents were asked to indicate how they felt various activities impacted water quality in the Lakeland area. The results are described below:

- Ninety-eight percent (98%) of residents felt dumping oil in the storm drain is "very" or "somewhat harmful" to water quality, 88% of residents felt throwing away paint in the regular trash is harmful, 83% felt washing paint brushes in the gutter is harmful, and 80% felt that disposing of leaves in the gutters and storm drains was harmful.

- Sixty percent (60%) of residents indicated they fertilize their yard on a regular basis. Forty-six percent (46%) of residents felt fertilizing the lawn with chemical fertilizers is harmful for water quality.

Perception of Various Problems Associated with Water Pollution
Seventy-five (75%) of residents felt the runoff from construction sites and erosion of river and stream banks was a "major" or "minor problem" in the area, 70% felt water pollution from stormwater runoff was a problem, and 65% felt water pollution from raw sewage was a problem in the area.

Level of Agreement with Statements Concerning Water Quality
Residents most strongly agreed on three issues concerning water quality; 1) the importance of making improvements to help prevent sewer overflows (87%); 2) the importance of governments working with other cities/counties to improve water quality (86%), and the importance of improving the quality of water in rivers and streams (83%).

Perception of Various Problems Associated with Stormwater and Water Pollution where Resident Property is Located.
Forty-three percent (43%) of residents felt that trash and debris in streams and drainage itches was a "major" or "minor problem" in the area, 39% felt that pollution in streams, ponds, and lakes was a problem, and 38% of residents felt soil and stream bank erosion was a problem in the area.

Implications of Results

The 2011 results mirror the 2008 results in overall concern of residents about pollution in streams and rivers in Lakeland. When asked to rate the importance of protecting water quality with other issues affecting residents, it ranks fifth this year, as opposed to third in 2008. Though the percentages of residents who currently participate in activities to help the environment has decreased, those who indicate a willingness to participate has increased or stayed the same in most areas. That shift is evident in other environmental studies as well.

Residents continue to have an awareness of the negative impact of many daily activities on water quality in local waterways, confirming that education efforts continue to be effective.

Section 1:

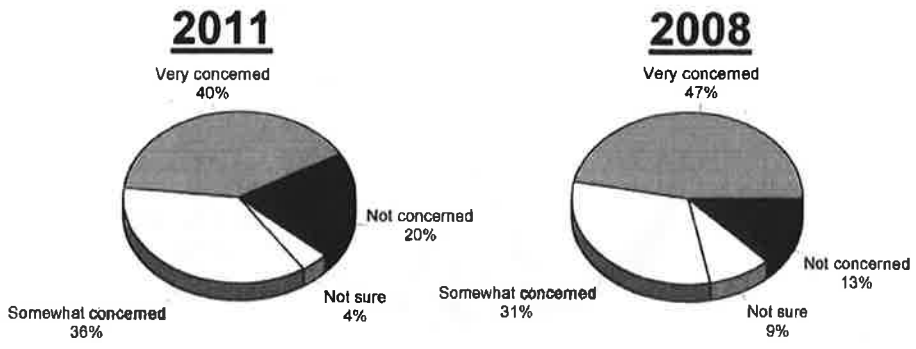
Charts and Graphs

2011 Stormwater Survey

City of Lakeland, Tennessee

Q1. Level of Concern About Pollution In Streams and Rivers in the Lakeland Area

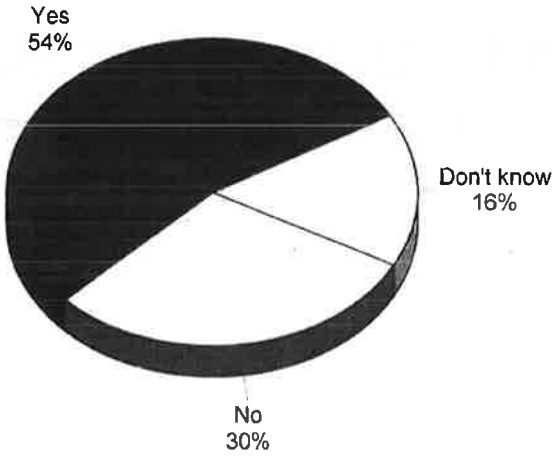
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q2. Do you think you can personally do anything to help improve water quality in streams and rivers in the Lakeland area?

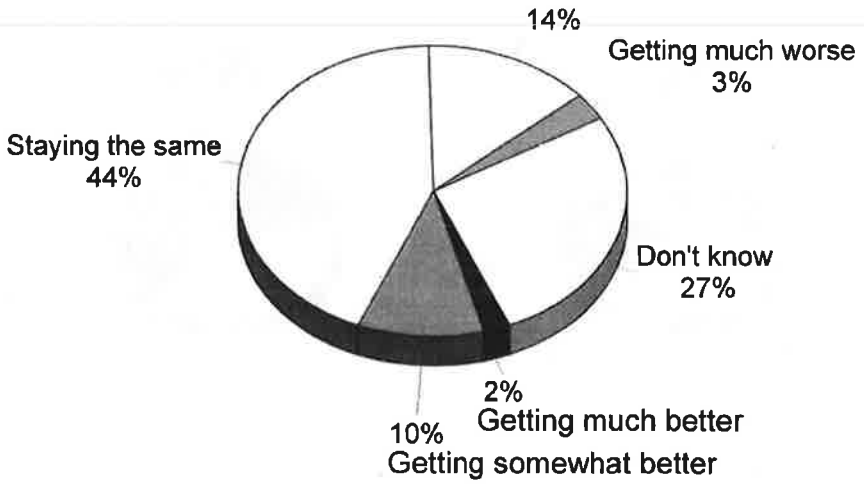
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q3. Do you think the quality of water in lakes and streams in the area where you live is:

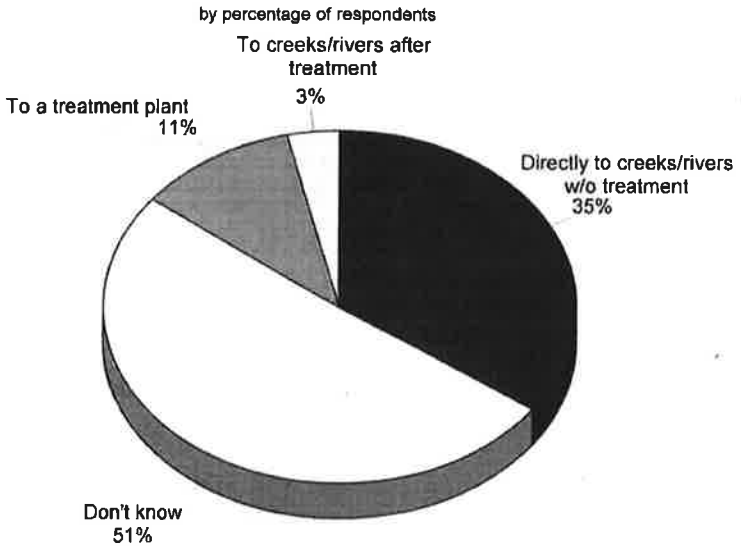
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q4. Where does stormwater (rain water) go after it enters a storm drain in your community?

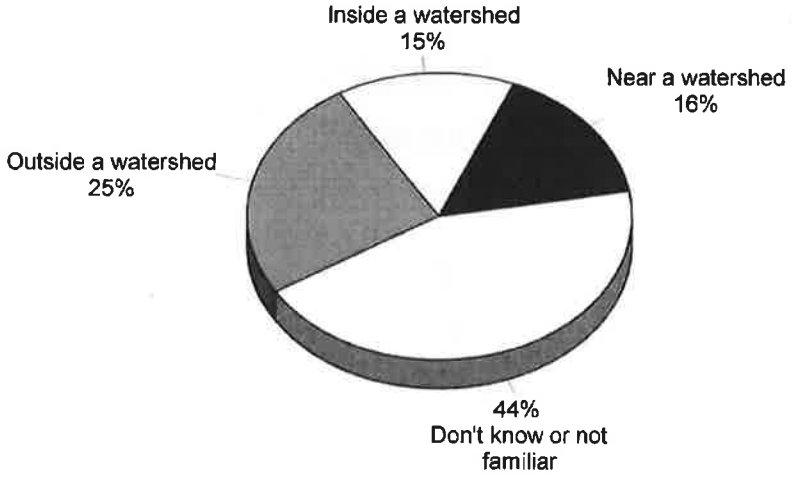
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q5. Best Description of the Location of Respondent Property In the Lakeland Area

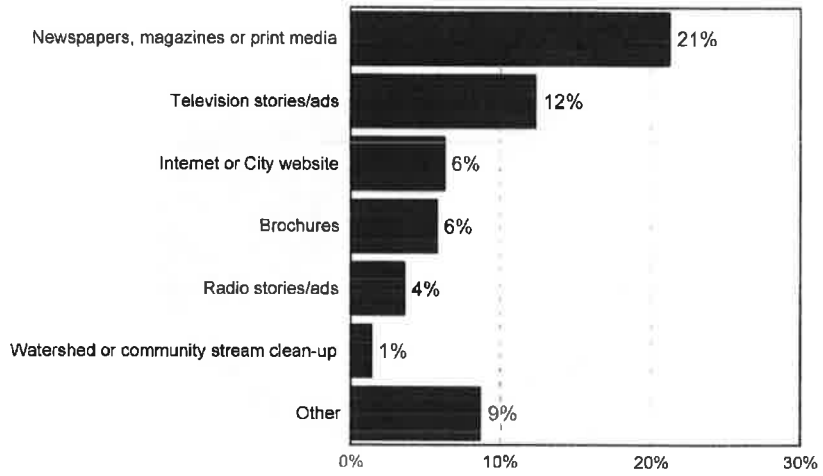
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q6. Have you seen or heard any information about water quality or stormwater from the following sources during the past year?

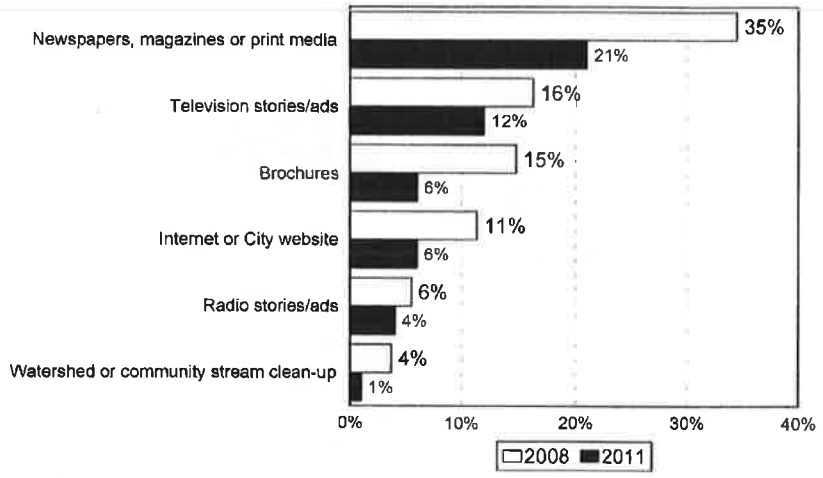
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q6. TRENDS:Have you seen or heard any information about water quality or stormwater from the following sources during the past year?

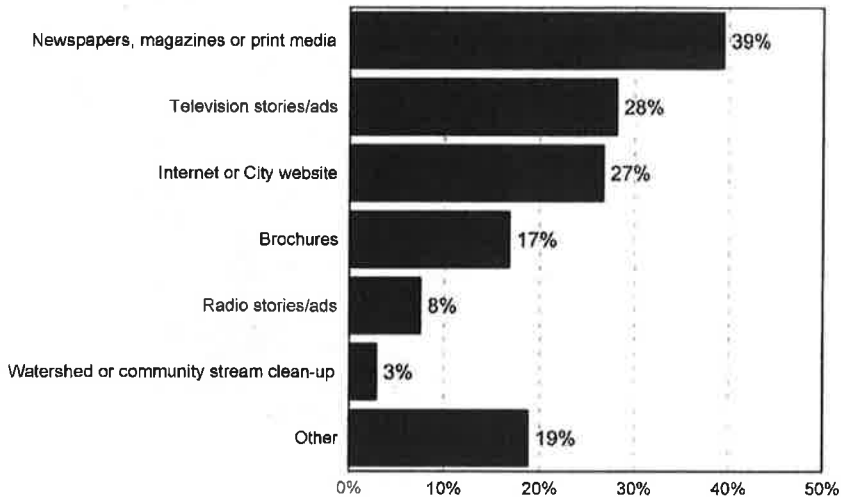
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q7. How would you like to receive information about stormwater and water quality?

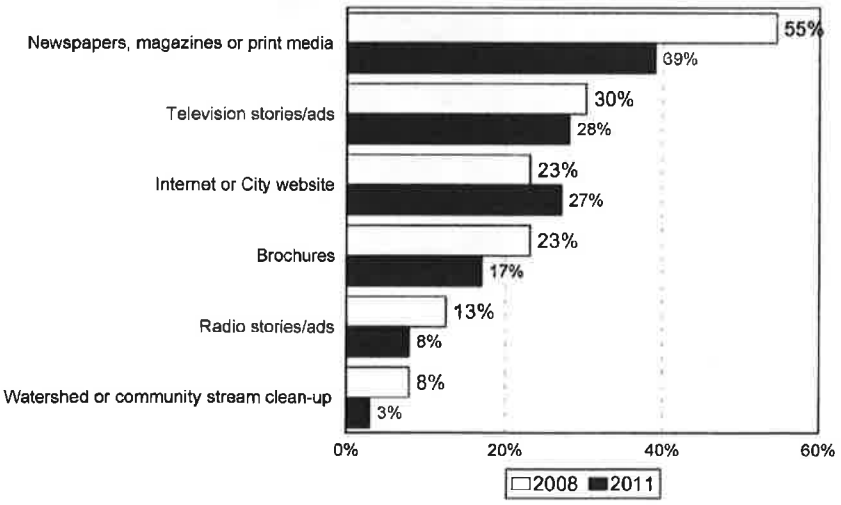
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q6. TRENDS: How would you like to receive information about stormwater and water quality?

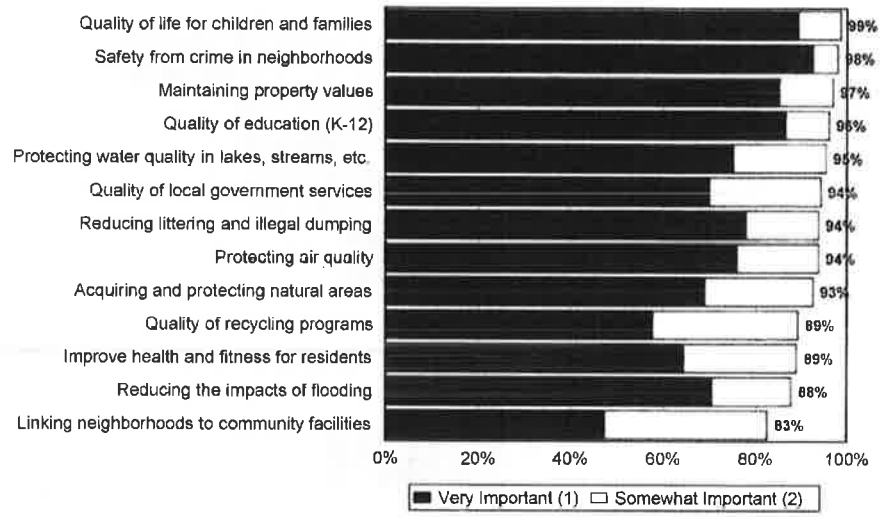
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q8. Perceived Importance of Various Issues Affecting Residents In the Lakeland Area

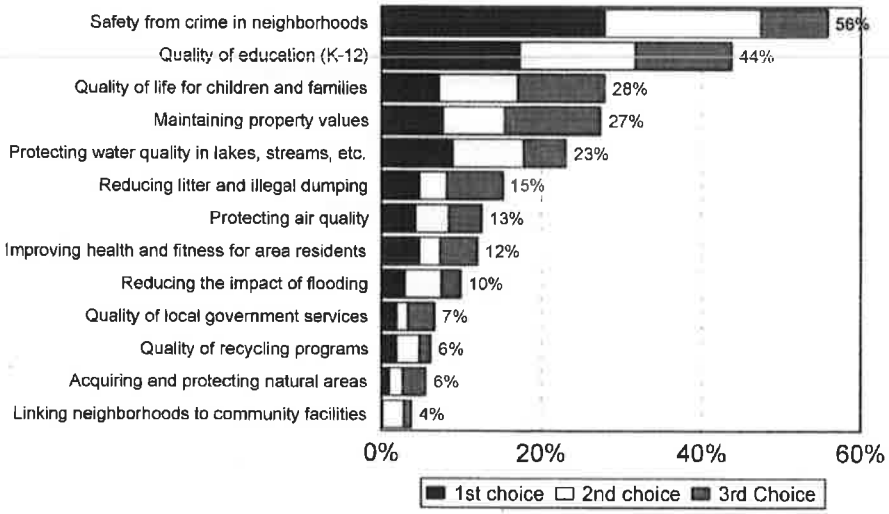
by percentage of respondents who rated the item as a 1 or 2 on a 5-point scale



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q9. Issues That Should Receive the Most Emphasis From City Leaders

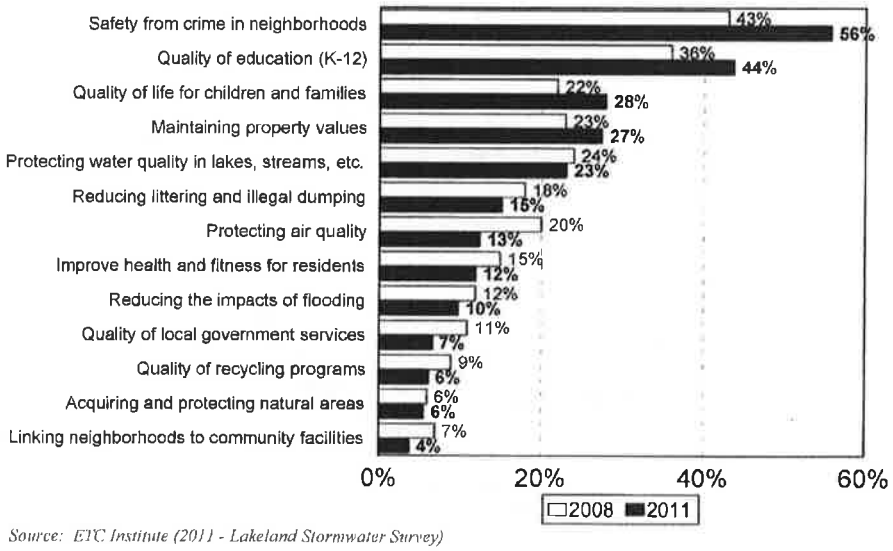
by percentage of residents surveyed who selected the item as one of their top three choices



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q9. TRENDS: Issues That Should Receive the Most Emphasis From City Leaders

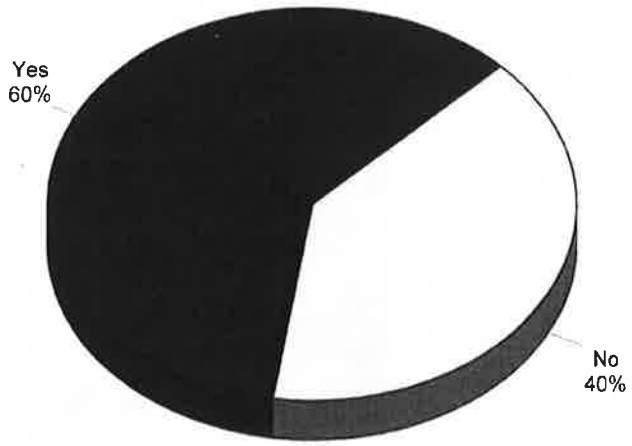
by percentage of residents surveyed who selected the item as one of their top three choices



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q10. Do you fertilize your yard on a regular basis?

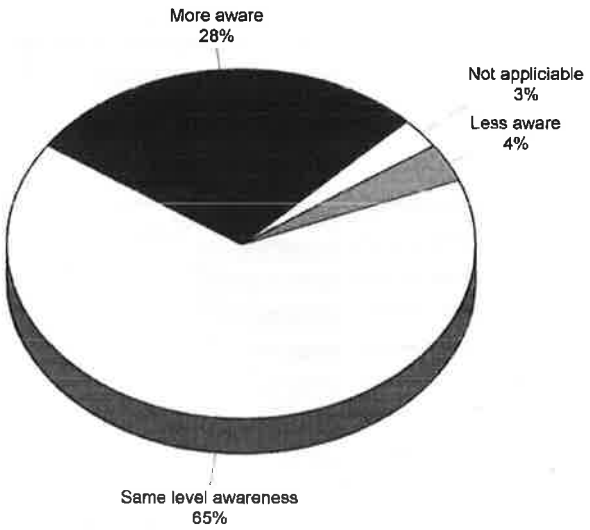
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q11. Compared to two years ago, how aware are you of the water quality of creeks and rivers.

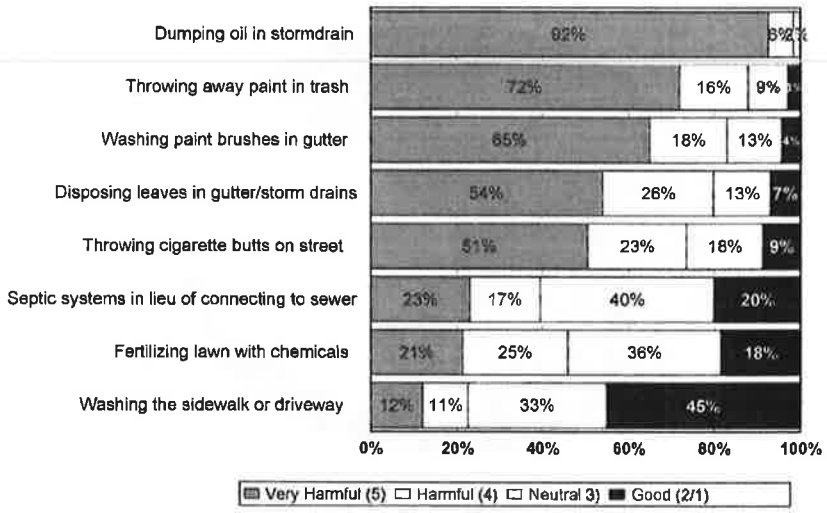
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q12. Residents Perceptions Of How Various Activities Effect Water Quality In the Lakeland Area

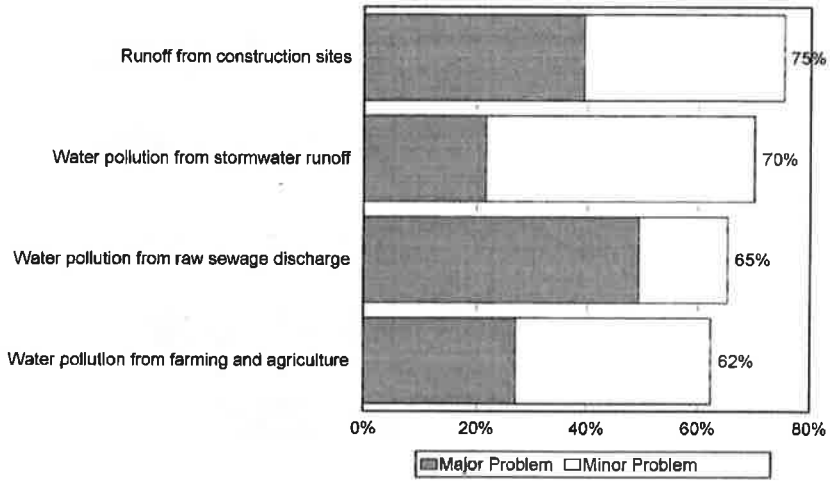
by percentage of respondents who rated the item as a 5 or 4 on a 5-point scale (excluding "not provided")



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q13. Perceptions of Various Problems Concerning Water Pollution In the Lakeland Area

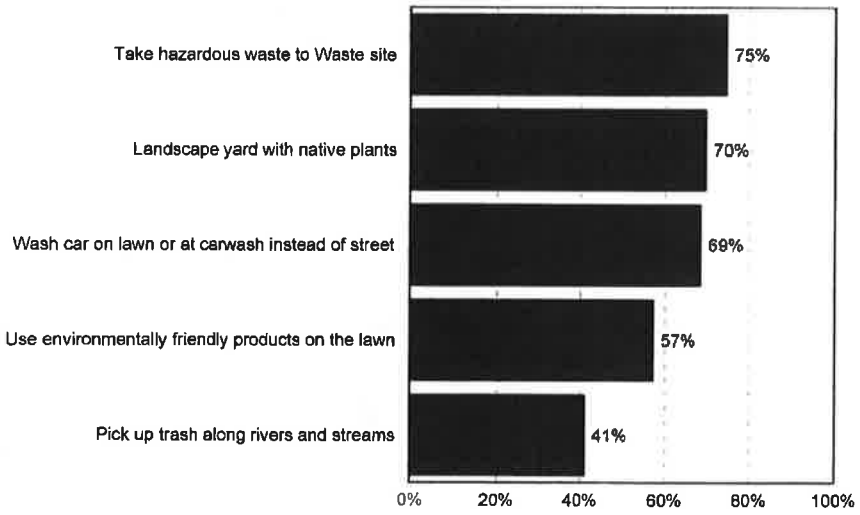
by percentage of respondents who rated the item as a 2 or 3 on a 4-point scale



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q14. Residents who Currently Participate in Various Activities to Help Protect the Environment

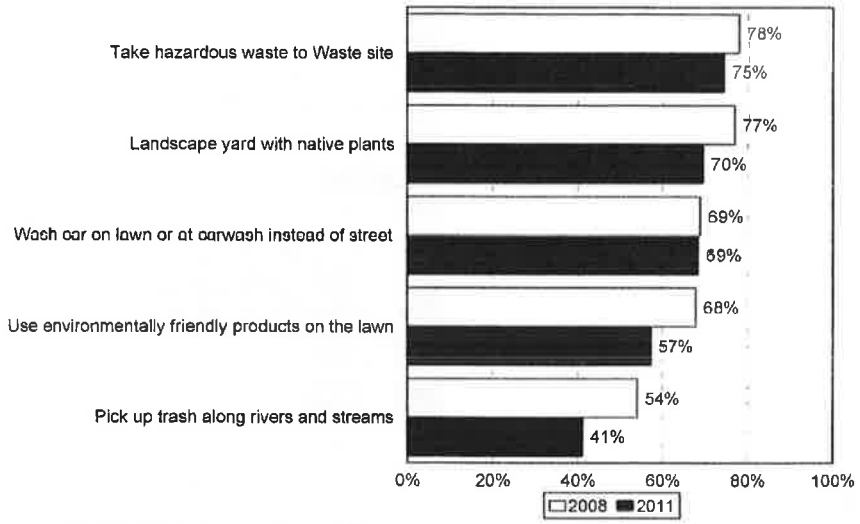
by percentage of respondents who responded "yes"



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q14. Residents who Currently Participate in Various Activities to Help Protect the Environment

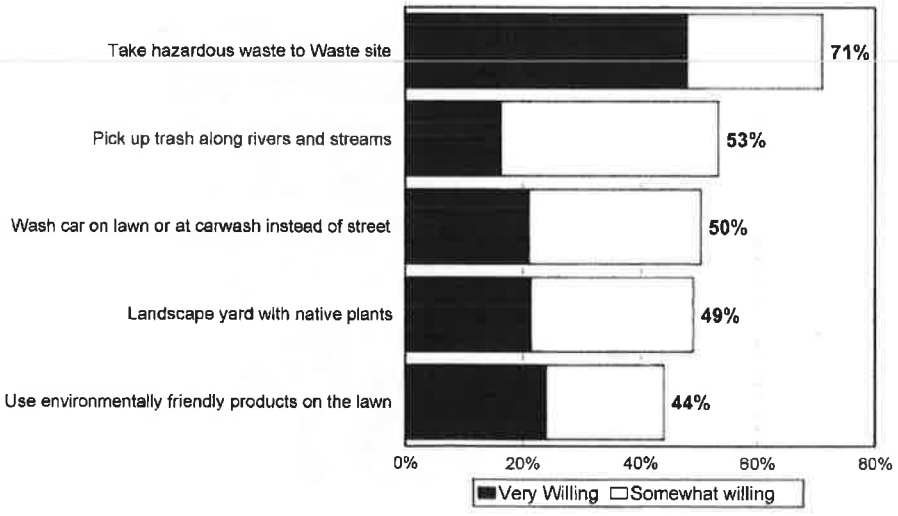
by percentage of respondents who responded "yes"



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q14A. Willingness of Residents to Participate in Various Activities to Help Protect the Environment

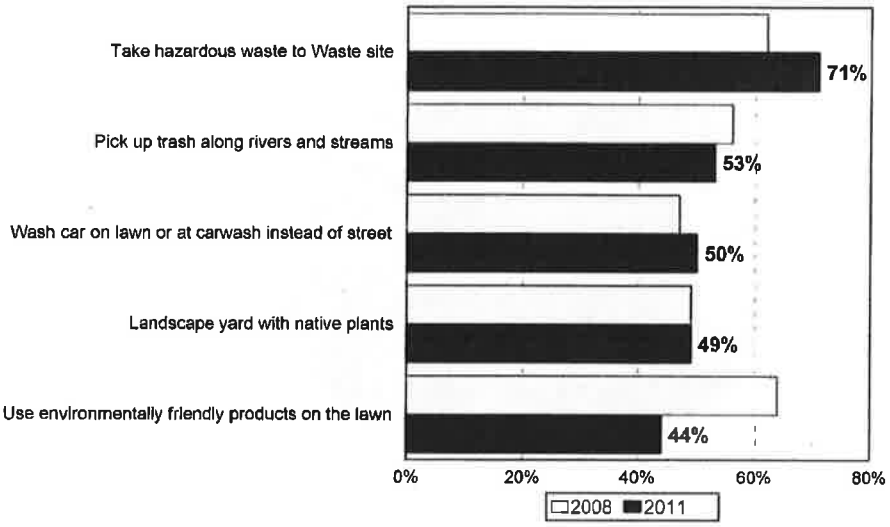
by percentage of respondents who responded "yes"



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q14A. TRENDS: Willingness of Residents to Participate in Various Activities to Help Protect the Environment

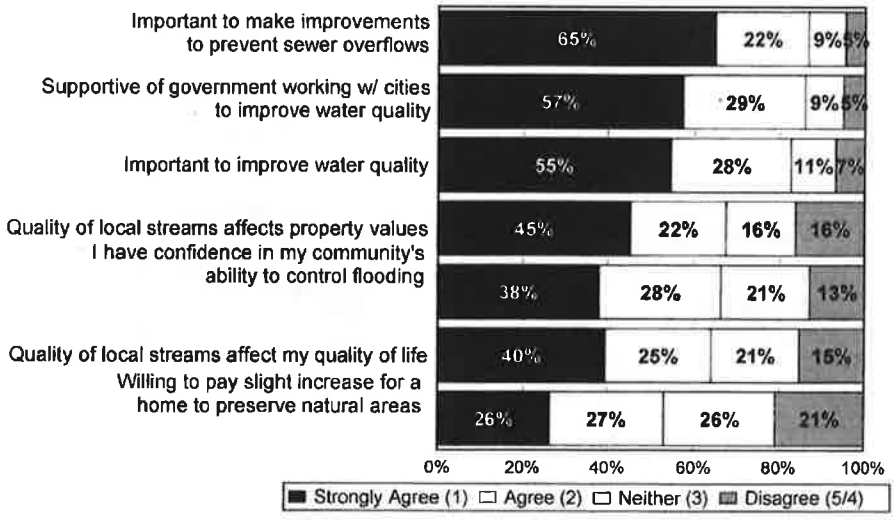
by percentage of respondents who responded "yes"



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q15. Level of Agreement With Various Statements Concerning Water Quality Issues

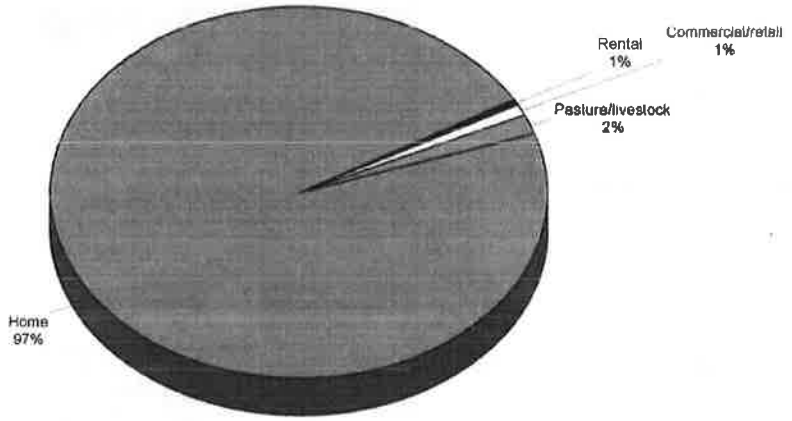
by percentage of respondents who rated the item as a1 to 5 on a 5-point scale (excluding "not provided")



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q16. Which of the following BEST describes the primary use for your property?

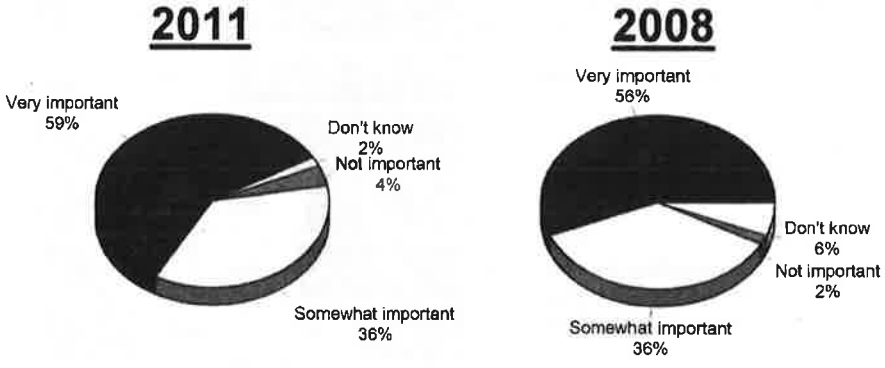
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q17. Compared to other City priorities, how important do you think it is for Lakeland to maintain and protect streams and stream corridors?

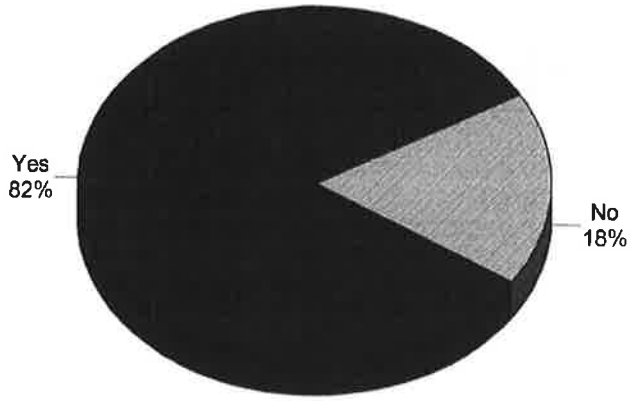
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q18. Do you have Broadband Internet service?

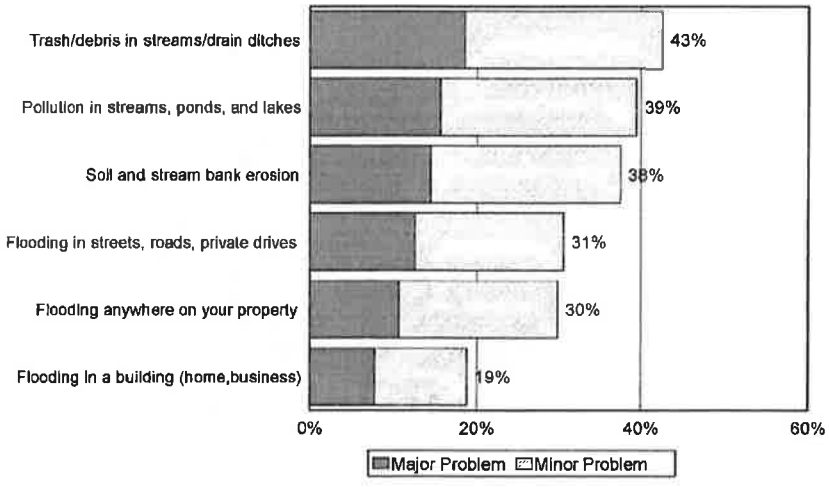
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q19. Perceptions of Various Problems Concerning Water Pollution In the Lakeland Area Where Your Property is Located

by percentage of respondents who rated the item as a 2 or 3 on a 5-point scale

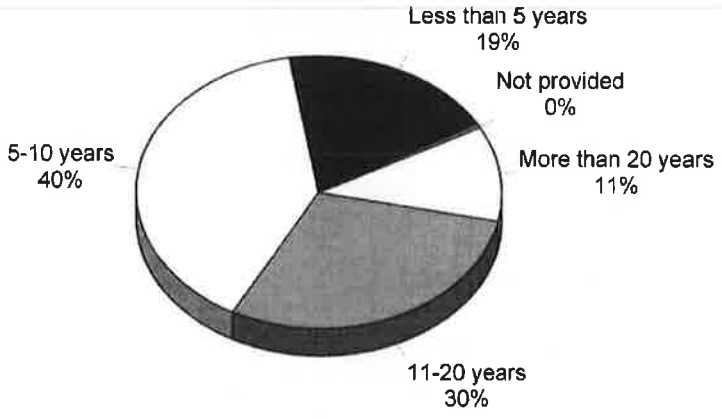


Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Demographics

Q20. Demographics: How many years have you lived in the City of Lakeland?

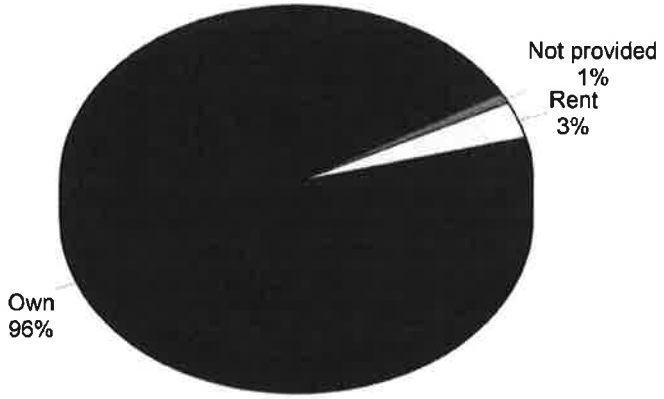
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q21. Demographics: Do you own or rent your current residence?

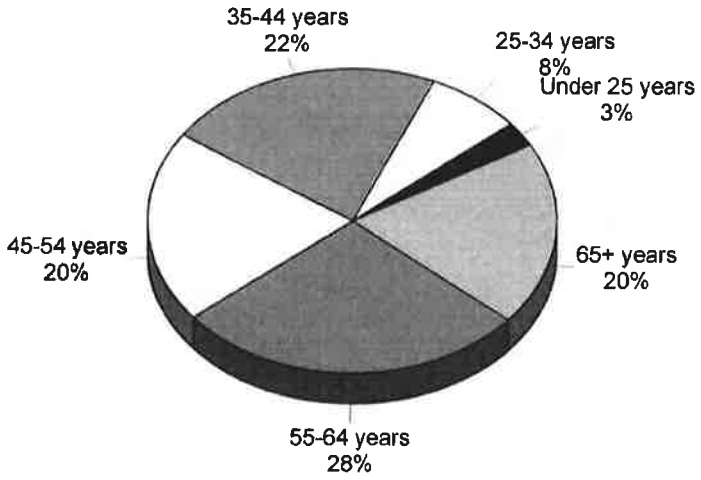
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q22. Demographics: What is your age?

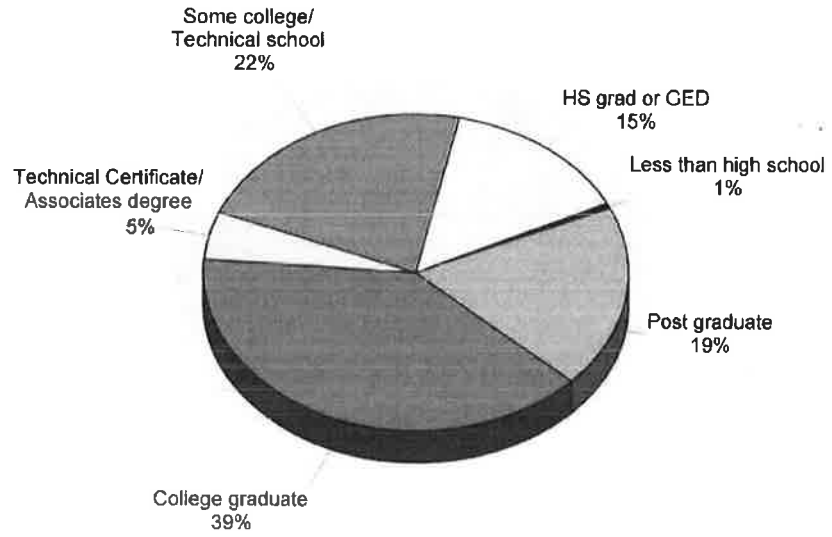
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q23. Demographics: What is your level of education?

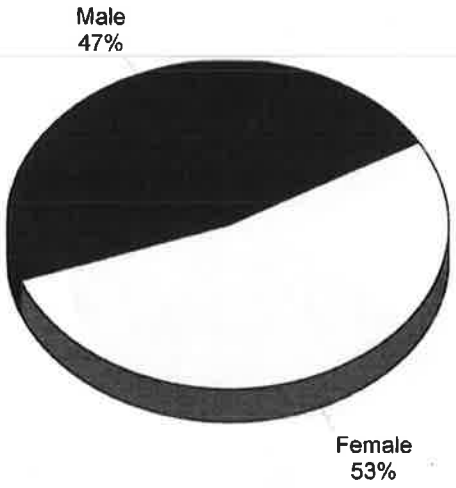
by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Q24. Demographics: Gender?

by percentage of respondents



Source: ETC Institute (2011 - Lakeland Stormwater Survey)

Section 2:

Tabular Data

Q1. How concerned are you about pollution in our streams and rivers

Q1. How concerned are you about pollution in our streams and rivers?	Number	Percent
Very concerned	167	40.1 %
Somewhat concerned	151	36.3 %
Not sure	15	3.6 %
Not concerned	83	20.0 %
Total	416	100.0 %

Q2. Do you think you can personally do anything to help improve water quality in streams and rivers?

Q2. Can you help improve water quality?	Number	Percent
Yes	226	54.3 %
No	123	29.6 %
Don't know	67	16.1 %
Total	416	100.0 %

Q2. Do you think you can personally do anything to help improve water quality in streams and rivers? (without "don't know")

Q2. Can you help improve water quality?	Number	Percent
Yes	226	64.8 %
No	123	35.2 %
Total	349	100.0 %

Q3. Do you think the quality of water in lakes and streams in the area where you live is:

Q3. Do you think the quality of water in lakes and streams where you live is:	Number	Percent
Getting much worse	13	3.1 %
Getting somewhat worse	56	13.5 %
Staying the same	182	43.8 %
Getting somewhat better	43	10.3 %
Getting much better	9	2.2 %
Don't know	113	27.2 %
Total	416	100.0 %

Q3. Do you think the quality of water in lakes and streams in the area where you live is: (without "don't know")

Q3. Do you think the quality of water in lakes and streams where you live is:	Number	Percent
Getting much worse	13	4.3 %
Getting somewhat worse	56	18.5 %
Staying the same	182	60.1 %
Getting somewhat better	43	14.2 %
Getting much better	9	3.0 %
Total	303	100.0 %

Q4. Where does stormwater (rain water) go after it enters a storm drain in your community?

Q4. Where does stormwater go after it enters a storm drain?	Number	Percent
Directly to our creeks and rivers without treatment	143	34.4 %
To creeks and river after receiving some treatment	14	3.4 %
To a wastewater treatment plant	47	11.3 %
Don't know	212	51.0 %
Total	416	100.0 %

Q4. Where does stormwater (rain water) go after it enters a storm drain in your community? (without "don't know")

Q4. Where does stormwater go after it enters a storm drain?	Number	Percent
Directly to our creeks and rivers without treatment	143	70.1 %
To creeks and river after receiving some treatment	14	6.9 %
To a wastewater treatment plant	47	23.0 %
Total	204	100.0 %

Q5. Which ONE of the following BEST describes the location where you live?

Q5. Best describes the location where you live	Number	Percent
I live near a watershed	67	16.1 %
I live In a watershed	61	14.7 %
I don't live in a watershed	105	25.2 %
Don't know/I'm not familiar with the term "watershed"	183	44.0 %
Total	416	100.0 %

Q6. Have you seen or heard any information about water quality during the past year?

Q6. What types of information have you seen or heard about water quality in past year	Number	Percent
Newspapers, magazines or other print media	88	21.2 %
Brochures	24	5.8 %
Television stories/ads	51	12.3 %
Radio stories/ads	15	3.6 %
Internet or City website	26	6.3 %
Watershed or community clean-up	6	1.4 %
Other	36	8.7 %
No response	244	58.7 %
Total	490	

Q6. Have you seen or heard any information about water quality during the past year? (without "no response")

Q6. What types of information have you seen or heard about water quality in past year	Number	Percent
Newspapers, magazines or other print media	88	21.2 %
Brochures	24	5.8 %
Television stories/ads	51	12.3 %
Radio stories/ads	15	3.6 %
Internet or City website	26	6.3 %
Watershed or community clean-up	6	1.4 %
Other	36	8.7 %
Total	246	

Q6. Other

Q7 Other
BILL INSERTS
BULLETIN BOARD
BY MAIL
BY MAIL
BY MAIL
BY MAIL
CHEAPEST WAY
CITY BULLETIN
CITY HALL
CITY HALL
CITY HALL
CITY MEETINGS
CITY NEWSLETTER
CITYWATCH
COMMUNITY NEWSLETTER
COMMUNITY OF LAKELAND
COMMUNITY WATCH NEWS LETT
DIRECT MAIL
DIRECT MAIL
DIRECT MAIL
E-MAIL
E-MAIL
E-MAIL
E-MAIL
E-MAIL
E-MAIL
E-MAIL AND DIRECT MAIL
E-MAIL DIRECT MAIL
EMAIL
EMAIL
EMAIL - FLYER
EMAIL AND MAIL
EMAILS OR FACEBOOK
GOVERNMENT
LAKELAND BULLETIN
LAKELAND CITY WATCH
LAKELAND E-NEWSLETTER
LAKELAND NEWSLETTER
MAIL

Q6. Other

Q7 Other
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL
MAIL OR PHONE CALL
MAILING
MAILINGS
MAYORS OFFICE
MGW
MGW MONTHLY BILL
NEWSLETTER
NEWSLETTER
NEWSLETTER
NEWSLETTER
NEWSLETTER
NEWSLETTER
NEWSLETTER
REPORTS FOR MGLW & COUNCI
SARA CLUB
WATER BILL
WATERBILL
WORD OF MOUTH
WORD OF MOUTH
WORK, NEWSLETTER

Q7. How would you like to receive information about stormwater runoff and water quality issues?

Q7. How would you like to receive information about water quality?	Number	Percent
Newspapers, magazines or other print media	164	39.4 %
Brochures	70	16.8 %
Television stories/ads	117	28.1 %
Radio stories/ads	31	7.5 %
Internet or City website	111	26.7 %
Watershed or community clean-up	12	2.9 %
Other	78	18.8 %
No response	24	5.8 %
Total	607	

Q7. How would you like to receive information about stormwater runoff and water quality issues? (without "no response")

Q7. How would you like to receive information about water quality?	Number	Percent
Newspapers, magazines or other print media	164	39.4 %
Brochures	70	16.8 %
Television stories/ads	117	28.1 %
Radio stories/ads	31	7.5 %
Internet or City website	111	26.7 %
Watershed or community clean-up	12	2.9 %
Other	78	18.8 %
Total	583	

Q8. Please rate each of the following issues:

(N=416)

	Very important	Somewhat important	Not sure	Not important	Don't know
Q8a. Protecting water quality in lakes, streams, and rivers	75.2%	20.2%	2.2%	2.4%	0.0%
Q8b. Reducing the impact of flooding	70.6%	17.1%	5.8%	6.3%	0.2%
Q8c. Improving health and fitness for area residents	64.4%	24.5%	5.3%	5.5%	0.2%
Q8d. Protecting air quality	76.0%	17.8%	2.4%	3.6%	0.2%
Q8e. Safety from crime in neighborhoods	92.5%	5.5%	1.0%	0.7%	0.2%
Q8f. Quality of life for children and families	89.2%	9.4%	1.0%	0.5%	0.0%
Q8g. Quality of education (K-12)	86.5%	9.6%	2.6%	1.2%	0.0%
Q8h. Quality of recycling programs	57.7%	31.5%	6.0%	4.6%	0.2%
Q8i. Maintain property values	85.1%	11.8%	1.2%	1.7%	0.2%
Q8j. Acquiring and protecting natural areas	69.0%	23.6%	3.8%	3.4%	0.2%
Q8k. Quality of local government services	70.0%	24.3%	3.6%	1.9%	0.2%
Q8l. Linking neighborhoods to community facilities	47.4%	35.1%	11.1%	6.0%	0.5%
Q8m. Reducing litter and illegal dumping	77.9%	15.9%	3.8%	2.4%	0.0%

Q9. Select THREE of these issues that you consider to be the most important.

Q9. Top choice	Number	Percent
Protecting water quality in lakes, streams, and rivers	37	8.9 %
Reducing the impact of flooding	12	2.9 %
Improving health and fitness for area residents	20	4.8 %
Protecting air quality	18	4.3 %
Safety from crime in neighborhoods	116	27.9 %
Quality of life for children and families	30	7.2 %
Quality of education (K-12)	72	17.3 %
Quality of recycling programs	8	1.9 %
Maintaining property values	32	7.7 %
Acquiring and protecting natural areas	4	1.0 %
Quality of local government services	8	1.9 %
Linking neighborhoods to community facilities	1	0.2 %
Reducing litter and illegal dumping	20	4.8 %
None chosen	38	9.1 %
Total	416	100.0 %

Q9. Select THREE of these issues that you consider to be the most important.

Q9. 2nd choice	Number	Percent
Protecting water quality in lakes, streams, and rivers	37	8.9 %
Reducing the impact of flooding	19	4.6 %
Improving health and fitness for area residents	11	2.6 %
Protecting air quality	17	4.1 %
Safety from crime in neighborhoods	81	19.5 %
Quality of life for children and families	41	9.9 %
Quality of education (K-12)	60	14.4 %
Quality of recycling programs	12	2.9 %
Maintaining property values	32	7.7 %
Acquiring and protecting natural areas	7	1.7 %
Quality of local government services	6	1.4 %
Linking neighborhoods to community facilities	11	2.6 %
Reducing litter and illegal dumping	14	3.4 %
None chosen	68	16.3 %
Total	416	100.0 %

Q9. Select THREE of these issues that you consider to be the most important.

Q9. 3rd choice	Number	Percent
Protecting water quality in lakes, streams, and rivers	22	5.3 %
Reducing the impact of flooding	10	2.4 %
Improving health and fitness for area residents	19	4.6 %
Protecting air quality	17	4.1 %
Safety from crime in neighborhoods	35	8.4 %
Quality of life for children and families	45	10.8 %
Quality of education (K-12)	50	12.0 %
Quality of recycling programs	6	1.4 %
Maintaining property values	50	12.0 %
Acquiring and protecting natural areas	12	2.9 %
Quality of local government services	14	3.4 %
Linking neighborhoods to community facilities	4	1.0 %
Reducing litter and illegal dumping	29	7.0 %
None chosen	103	24.8 %
Total	416	100.0 %

Q9. Select THREE of these issues that you consider to be the most important. (Top three)

Q9. Top choice	Number	Percent
Protecting water quality in lakes, streams, and rivers	96	23.1 %
Reducing the impact of flooding	41	9.9 %
Improving health and fitness for area residents	50	12.0 %
Protecting air quality	52	12.5 %
Safety from crime in neighborhoods	232	55.8 %
Quality of life for children and families	116	27.9 %
Quality of education (K-12)	182	43.8 %
Quality of recycling programs	26	6.3 %
Maintaining property values	114	27.4 %
Acquiring and protecting natural areas	23	5.5 %
Quality of local government services	28	6.7 %
Linking neighborhoods to community facilities	16	3.8 %
Reducing litter and illegal dumping	63	15.1 %
None chosen	38	9.1 %
Total	1077	

Q10. Do you fertilize your yard on a regular basis?

Q10. Do you fertilize your yard on a regular basis?	Number	Percent
Yes	248	59.8 %
No	164	39.5 %
Don't know	3	0.7 %
Total	415	100.0 %

Q11. Compared to two years ago, would you say you:

Q11. Compared to two years ago, would you say you:	Number	Percent
Are more aware of the water quality of creeks and rivers	116	27.9 %
Have about the same level of awareness about water quality issues	271	65.1 %
Are less aware of the water quality of streams and rivers	15	3.6 %
N/A (did not live in Lakeland two years ago)	12	2.9 %
No response	2	0.5 %
Total	416	100.0 %

Q12. Please rate the following activities on a scale of 1 to 5, where 1 is "Very Good" and 5 is "Very Harmful" for the water quality.

(N=416)

	Very good	Rather good	Neutral	Harmful	Very harmful	Don't know
Q12a. Dumping oil in the storm drain	0.0%	0.2%	1.4%	5.8%	91.1%	1.4%
Q12b. Throwing away paint in your regular trash	0.7%	2.2%	9.1%	15.6%	70.7%	1.7%
Q12c. Washing paint brushes in the street gutter	1.4%	2.9%	12.5%	17.8%	64.2%	1.2%
Q12d. Washing the sidewalk and driveway	16.8%	27.4%	32.0%	10.3%	11.8%	1.7%
Q12e. Use of septic systems in lieu of connecting to public sewer	7.9%	10.1%	36.3%	14.9%	20.7%	10.1%
Q12f. Fertilizing the lawn with chemical fertilizers	4.1%	13.7%	34.6%	23.8%	20.7%	3.1%
Q12g. Throwing cigarette butts on the street	2.4%	6.3%	17.5%	22.8%	50.0%	1.0%
Q12h. Disposing of leaves or grass clippings in the street or in storm drains	2.4%	4.6%	13.0%	25.7%	53.6%	0.7%

Q12. Please rate the following activities on a scale of 1 to 5, where 1 is "Very Good" and 5 is "Very Harmful" for the water quality. (without "don't know")

(N=416)

	Very good	Rather good	Neutral	Harmful	Very harmful
Q12a. Dumping oil in the storm drain	0.0%	0.2%	1.5%	5.9%	92.4%
Q12b. Throwing away paint in your regular trash	0.7%	2.2%	9.3%	15.9%	71.9%
Q12c. Washing paint brushes in the street gutter	1.5%	2.9%	12.7%	18.0%	65.0%
Q12d. Washing the sidewalk and driveway	17.1%	27.9%	32.5%	10.5%	12.0%
Q12e. Use of septic systems in lieu of connecting to public sewer	8.8%	11.2%	40.4%	16.6%	23.0%
Q12f. Fertilizing the lawn with chemical fertilizers	4.2%	14.1%	35.7%	24.6%	21.3%
Q12g. Throwing cigarette butts on the street	2.4%	6.3%	17.7%	23.1%	50.5%
Q12h. Disposing of leaves or grass clippings in the street or in storm drains	2.4%	4.6%	13.1%	25.9%	54.0%

Q13. Please indicate whether each of the following is "Not a Problem," a "Minor Problem" or a "Major Problem".

(N=416)

	Not a problem	Minor problem	Major problem	Don't know
Q13a. Water pollution from stormwater running off streets, parking lots, lawns, etc.	27.4%	44.2%	19.7%	8.7%
Q13b. Water pollution from raw sewage discharge from sewer systems	30.3%	13.9%	43.0%	12.7%
Q13c. Water pollution from farming and agriculture	32.5%	30.3%	23.3%	13.9%
Q13d. Runoff from construction sites and erosion of river and stream banks	22.8%	32.9%	36.3%	7.9%

Q13. Please indicate whether each of the following is "Not a Problem," a "Minor Problem" or a "Major Problem". (without "don't know")

(N=416)

	Not a problem	Minor problem	Major problem
Q13a. Water pollution from stormwater running off streets, parking lots, lawns, etc.	30.0%	48.4%	21.6%
Q13b. Water pollution from raw sewage discharge from sewer systems	34.7%	16.0%	49.3%
Q13c. Water pollution from farming and agriculture	37.7%	35.2%	27.1%
Q13d. Runoff from construction sites and erosion of river and stream banks	24.8%	35.8%	39.4%

Q14. Do you currently participate in this activity?

(N=416)

	Yes	No
Q14a. Use environmentally friendly products on your lawn	57.2%	42.8%
Q14b. Pick up trash along streams and the river in your community	41.1%	58.9%
Q14c. Take household hazardous waste to the Household Hazardous Waste site	74.5%	25.5%
Q14d. Wash your car on the lawn/grass instead of the street or driveway	68.5%	31.5%
Q14e. Landscape with native plants	69.7%	30.3%

Q14. Please indicate whether you would be "Very Willing," "Somewhat Willing," "Not Sure," or "Not Willing" to do each of the following:

(N=416)

	Very willing	Somewhat willing	Not sure	Not willing	Don't know
Q14-a. Use environmentally friendly products on your lawn	21.2%	17.9%	31.3%	17.9%	11.7%
Q14-b. Pick up trash along streams and the river in your community	15.9%	35.9%	19.2%	26.1%	2.9%
Q14-c. Take household hazardous waste to the Household Hazardous Waste site	44.9%	21.5%	18.7%	8.4%	6.5%
Q14-d. Wash your car on the lawn/grass instead of the street or driveway	20.9%	29.1%	17.9%	31.3%	0.7%
Q14-e. Landscape with native plants	19.0%	24.6%	28.6%	16.7%	11.1%

Q14. Please indicate whether you would be "Very Willing," "Somewhat Willing," "Not Sure," or "Not Willing" to do each of the following: (without "don't know")

(N=416)

	Very willing	Somewhat willing	Not sure	Not willing
Q14-a. Use environmentally friendly products on your lawn	24.1%	20.3%	35.4%	20.3%
Q14-b. Pick up trash along streams and the river in your community	16.4%	37.0%	19.7%	26.9%
Q14-c. Take household hazardous waste to the Household Hazardous Waste site	48.0%	23.0%	20.0%	9.0%
Q14-d. Wash your car on the lawn/grass instead of the street or driveway	21.1%	29.3%	18.0%	31.6%
Q14-e. Landscape with native plants	21.4%	27.7%	32.1%	18.8%

Q15. Using a scale of 1 to 5, where 1 means "Strongly Agree" and 5 means "Strongly Disagree," please indicate your level of agreement with each of the following statements.

(N=416)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Don't know
Q15a. The quality of local streams where I live affects my quality of life	38.7%	24.0%	20.4%	7.0%	7.9%	1.9%
Q15b. The quality of local streams where I live affects property values	44.5%	21.9%	16.1%	7.0%	8.9%	1.7%
Q15c. It is important to improve the quality of water in rivers and streams	53.8%	27.9%	10.3%	3.1%	3.6%	1.2%
Q15d. It is important to make improvements to help prevent sewer overflows	64.4%	21.9%	8.4%	2.4%	2.2%	0.7%
Q15e. I have confidence in my community's ability to address flooding problems	37.3%	27.6%	20.7%	7.9%	4.6%	1.9%
Q15f. Willing to pay slightly more for a home to preserve natural areas	25.7%	26.0%	25.5%	7.2%	13.2%	2.4%
Q15g. I would support my local government working with other cities/counties	56.5%	28.4%	8.7%	2.2%	2.9%	1.4%

Q15. Using a scale of 1 to 5, where 1 means "Strongly Agree" and 5 means "Strongly Disagree," please indicate your level of agreement with each of the following statements. (without "don't know")

(N=416)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Q15a. The quality of local streams where I live affects my quality of life	39.5%	24.5%	20.8%	7.1%	8.1%
Q15b. The quality of local streams where I live affects property values	45.2%	22.2%	16.4%	7.1%	9.0%
Q15c. It is important to improve the quality of water in rivers and streams	54.5%	28.2%	10.5%	3.2%	3.6%
Q15d. It is important to make improvements to help prevent sewer overflows	64.9%	22.0%	8.5%	2.4%	2.2%
Q15e. I have confidence in my community's ability to address flooding problems	38.0%	28.2%	21.1%	8.1%	4.7%
Q15f. Willing to pay slightly more for a home to preserve natural areas	26.4%	26.6%	26.1%	7.4%	13.5%
Q15g. I would support my local government working with other cities/counties	57.3%	28.8%	8.8%	2.2%	2.9%

Q16. Which of the following BEST describes the primary use for your property?

Q16. What is the primary use for your property?	Number	Percent
Home	398	95.7 %
Agricultural - pasture/livestock	7	1.7 %
Commercial/retail property	2	0.5 %
Rental	6	1.4 %
No response	3	0.7 %
Total	416	100.0 %

Q16. Which of the following BEST describes the primary use for your property?

Q16. 2nd	Number	Percent
Home	1	0.2 %
Commercial/retail property	1	0.2 %
No response	414	99.5 %
Total	416	100.0 %

Q17. How important do you think it is for Lakeland to maintain and protect streams and stream corridors?

Q17. How important is it for Lakeland to maintain and protect streams?	Number	Percent
Very important	244	58.7 %
Somewhat important	149	35.8 %
Not important	16	3.8 %
Don't know	7	1.7 %
Total	416	100.0 %

Q17. How important do you think it is for Lakeland to maintain and protect streams and stream corridors? (without "don't know")

Q17. How important is it for Lakeland to maintain and protect streams?	Number	Percent
Very important	244	59.7 %
Somewhat important	149	36.4 %
Not important	16	3.9 %
Total	409	100.0 %

Q18. Do you have broadband Internet service?

Q18. Do you have broadband Internet service?	Number	Percent
Yes	335	80.9 %
No	72	17.4 %
Don't know	7	1.7 %
Total	414	100.0 %

Q18. Do you have broadband Internet service? (without "don't know")

Q18. Do you have broadband Internet service?	Number	Percent
Yes	335	82.3 %
No	72	17.7 %
Total	407	100.0 %

Q19. Please indicate whether each of the following is a "Major Problem," a "Minor Problem" or "Not a Problem" in the area where your property is located.
(N=416)

	Major problem	Minor problem	Not a problem	Don't know/Not Applicable
Q19a. Flooding anywhere on your property	10.6%	19.2%	68.5%	1.7%
Q19b. Flooding in a building (home, business, etc.) on your property	7.7%	11.1%	79.1%	2.2%
Q19c. Flooding in streets, roads, or private drives	12.5%	18.0%	67.5%	1.9%
Q19d. Soil and stream bank erosion	14.4%	23.1%	56.5%	6.0%
Q19e. Trash/debris in the streams & drainage ditches	18.5%	24.0%	52.4%	5.0%
Q19f. Pollution in streams, ponds, and lakes	15.6%	23.8%	51.2%	9.4%

Q19. Please indicate whether each of the following is a "Major Problem," a "Minor Problem" or "Not a Problem" in the area where your property is located. (without "don't know/not applicable")
(N=416)

	Major problem	Minor problem	Not a problem
Q19a. Flooding anywhere on your property	10.8%	19.6%	69.7%
Q19b. Flooding in a building (home, business, etc.) on your property	7.9%	11.3%	80.8%
Q19c. Flooding in streets, roads, or private drives	12.7%	18.4%	68.9%
Q19d. Soil and stream bank erosion	15.3%	24.6%	60.1%
Q19e. Trash/debris in the streams & drainage ditches	19.5%	25.3%	55.2%
Q19f. Pollution in streams, ponds, and lakes	17.2%	26.3%	56.5%

Q20. Approximately how many years have you lived in the City of Lakeland?

Q20. How many years lived in Lakeland?	Number	Percent
Less than 5 years	80	19.2 %
5-10 years	165	39.7 %
11-20 years	123	29.6 %
More than 20 years	46	11.1 %
Don't know	2	0.5 %
Total	416	100.0 %

Q21. Do you own or rent your current residence?

Q21. Do you own or rent your current residence?	Number	Percent
Own	398	95.7 %
Rent	14	3.4 %
No response	4	1.0 %
Total	416	100.0 %

Q22. What is your age?

Q22. What is your age?	Number	Percent
Under 25	11	2.6 %
25 to 34	32	7.7 %
35 to 44	91	21.9 %
45 to 54	85	20.4 %
55 to 64	116	27.9 %
65+	81	19.5 %
Total	416	100.0 %

Q23. What best describes your level of education?

Q23. What best describes your level of education?	Number	Percent
Less than High School	2	0.5 %
High school or GED equivalent	58	13.9 %
Some college/technical school	88	21.2 %
Technical school certification/Associate's degree	19	4.6 %
College graduate	156	37.5 %
Post graduate	74	17.8 %
No response	19	4.6 %
Total	416	100.0 %

Q23. What best describes your level of education?

Q23. What best describes your level of education?	Number	Percent
Less than High School	2	0.5 %
High school or GED equivalent	58	14.6 %
Some college/technical school	88	22.2 %
Technical school certification/Associate's degree	19	4.8 %
College graduate	156	39.3 %
Post graduate	74	18.6 %
Total	397	100.0 %

Q24. Gender

Q24. Gender	Number	Percent
Male	196	47.1 %
Female	220	52.9 %
Total	416	100.0 %

Section 3:

Survey Instrument

Interviewer:_____ **Phone:**_____

2008 Lakeland STORMWATER RUNOFF AND WATER QUALITY SURVEY

This is _____ calling for the City of Lakeland about stormwater runoff and water quality issues affecting Lakeland. This study is a part of the City's on-going effort to involve citizens in the issues and the solutions for issues like stormwater runoff and water quality management. Would you have a few minutes to help us with the study?

If NO: Ask – would there be a better time to call: NOTE DATE/TIME_____
If YES: Ask – Do you live within the City limits of Lakeland? _____YES (continue) or _____NO (Thank them for their time and end the interview)

1. **How concerned are you about pollution in our streams and rivers in the Lakeland area?**
   ____(1) Very concerned
   ____(2) Somewhat concerned
   ____(3) Not sure
   ____(4) Not concerned

2. **Do you think you can <u>personally</u> do anything to help improve water quality in streams and rivers in the Lakeland area?**
   ____(1) Yes ____(2) No ____(9) Don't know

3. **Where does stormwater (rain water) go after it enters a storm drain in your community?**
   ____(1) Directly to our creeks and river without treatment
   ____(2) To creeks and river after receiving some treatment
   ____(3) To a wastewater treatment plant
   ____(9) Don't know

4. **Which ONE of the following BEST describes the location where you live?** (check one)
   ____(1) I live near a watershed
   ____(2) I live in a watershed
   ____(3) I don't live in a watershed
   ____(4) Don't know/I'm not familiar with the term "watershed"

5. **Have you seen or heard any information about water quality or stormwater runoff in our streams or rivers from the following sources in the Lakeland area during the past year?**

   What types of information <u>have</u> you seen or heard? [Check all that apply]
   ____(1) Newspapers, magazines or other print media
   ____(2) Brochures
   ____(3) Television stories/ads
   ____(4) Radio stories/ads
   ____(5) Internet or City website
   ____(6) Watershed or community stream clean-up
   ____(9) Other: _____

6. **How would you <u>like</u> to receive information about stormwater runoff and water quality issues in our creeks and rivers?** [Check all that apply]
   ____(1) Newspapers, magazines or other print media
   ____(2) Brochures
   ____(3) Television stories/ads
   ____(4) Radio stories/ads
   ____(5) Internet or City website
   ____(6) Watershed or community stream clean-up
   ____(9) Other: _____

7. **I am going to ask you about several issues that residents of the City of Lakeland are discussing.**

Using a scale of 1 to 5 where 5 means "not important" and 1 means "very important", please rate each of the following issues:

	Very Important	Somewhat Important	Not Sure	Not Important
(A) Protecting water quality in lakes, streams, and rivers	1	2	3	4
(B) Reducing the impacts of flooding	1	2	3	4
(C) Improving health and fitness for area residents	1	2	3	4
(D) Protecting air quality	1	2	3	4
(E) Safety from crime in neighborhoods	1	2	3	4
(F) Quality of life for children and families	1	2	3	4
(G) Quality of education (K-12)	1	2	3	4
(H) Quality of recycling programs	1	2	3	4
(I) Maintaining property values	1	2	3	4
(J) Acquiring and protecting natural areas	1	2	3	4
(K) Quality of local government services	1	2	3	4
(L) Linking neighborhoods to community facilities	1	2	3	4
(M) Reducing litter and illegal dumping	1	2	3	4

8. Select the THREE issues that you consider to be the most important by from question 1 above to indicate your choices.

1st choice _____ 2nd choice _____ 3rd choice _____

9. Compared to two years ago, would you say you:

____(1) are more aware of the water quality of creeks and rivers in the Lakeland area
____(2) have about the same level of awareness about water quality issues
____(3) are less aware of the water quality of streams and rivers in the Lakeland area
____(4) Not applicable (did not live in Lakeland two years ago)

10. Please rate the following activities on a scale of 1 to 5 where 1 is "very good" and 5 is "very harmful" for the water quality in the Lakeland area?

		Very Good	Rather Good	Neutral	Harmful	Very Harmful
(A)	Fertilizing the lawn with chemical fertilizers	1	2	3	4	5
(B)	Throwing away paint in your regular trash	1	2	3	4	5
(C)	Washing paint brushes in the street gutter	1	2	3	4	5
(D)	Washing the sidewalk and driveway	1	2	3	4	5
(E)	Use of Septic systems in lieu of connecting to public sewer	1	2	3	4	5
(F)	Throwing cigarette butts on the street	1	2	3	4	5
(G)	Dumping oil in the storm drain	1	2	3	4	5
(H)	Disposing of leaves in the street or in storm drains	1	2	3	4	5

11. Please indicate whether each of the following is "not a problem," a "minor problem" or "a major problem" in the Lakeland area.

		Not a Problem	Minor Problem	Major Problem	Don't Know
(A)	Water pollution from storm water running off streets, parking lots, lawns, etc	1	2	3	9
(B)	Water pollution from raw sewage discharge from sewer systems	1	2	3	9
(C)	Water pollution from farming and agriculture	1	2	3	9

12. Next, I am going to read several ways that residents can help protect the environment in the

Lakeland area. Please indicate if you currently participate in this activity, and if you DO NOT currently participate, please indicate whether you would be "very willing," "somewhat willing," "not sure," or "not willing" to do each of the following:

Do you currently do this activity?			*If NO, How Willing Would You Be?* Very Willing	Somewhat Willing	Not Sure	Not Willing
YES	NO	(A) Use environmentally friendly products on your lawn	1	2	3	4
YES	NO	(B) Pick up trash along streams and the river in your community	1	2	3	4
YES	NO	(C) Take household hazardous waste, such as paint and motor oil to the Household Hazardous Waste site	1	2	3	4
YES	NO	(D) Wash your car on the lawn/grass or carwash instead of the street or driveway	1	2	3	4
YES	NO	(E) Landscape with native plants	1	2	3	4

13. Using a scale of 1 to 5 where "1" means "Strongly Agree" and "5" means "Strongly Disagree," please indicate your level of agreement with each of the following statements

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
(A) The quality of local streams where I live affects my quality of life	1	2	3	4	5
(B) The quality of local streams where I live affects property values	1	2	3	4	5
(C) I think it is important to improve the quality of water in rivers and streams in my community	1	2	3	4	5
(D) I think it is important to make improvements that will help prevent sewer overflows into creeks and streams during heavy rains	1	2	3	4	5
(E) I have confidence in my community's ability to address flooding related problems	1	2	3	4	5
(F) I would be willing to pay a slight increase when buying a home to pay for preserving natural areas in my neighborhood	1	2	3	4	5
(G) I would be supportive of my local government working with other cities and counties to improve water quality	1	2	3	4	5

14. Which of the following BEST describes the <u>primary use</u> for your property? (check one)

___(1) Home
___(2) Agricultural – farming/row crops
___(3) Agricultural – pasture/livestock
___(4) Commercial/retail property
___(5) Rental
___(9) Other: _____

15. Compared to other City priorities, such as road maintenance, parks and recreation, and public safety, how important do you think it is for Lakeland to maintain and protect streams and stream corridors (check one)

___(1) Very important
___(2) Somewhat important
___(3) Not important
___(9) Don't know

16. Do you have broadband Internet service?

___(1) Yes ___(2) No

17. Please indicate whether each of the following is a "major problem," a "minor problem" or "not a problem" in the area where your property is located by circling the corresponding number below.

	Major Problem	Minor Problem	Not a Problem	Don't Know/ Not Applicable
(A) Flooding anywhere on your property	3	2	1	9
(B) Flooding in a building (home, business, etc) on your property	3	2	1	9
(C) Flooding in streets, roads, or private drives	3	2	1	9
(D) Soil and stream bank erosion	3	2	1	9
(E) Trash/debris in the streams & drainage ditches	3	2	1	9
(F) Pollution in streams, ponds, and lakes	3	2	1	9

18. Improvements to the quality of stormwater management in Lakeland may require funding through an assessment on your monthly utility bill. As a resident of Lakeland, what range of monthly fees would you be willing to pay to solve drainage, flooding, and surface water pollution problems in Lakeland?

___(1) $1 to $5
___(2) $6 to $10
___(3) No Fee
___(4) Other
___(5) Don't know

DEMOGRAPHICS

19. Approximately how many years have you lived in the City of Lakeland?

____(1) Less than 5 years
____(2) 5-10 years
____(3) 11-20 years
____(4) More than 20 years
____(9) [DO NOT READ] Don't know

20. Do you own or rent your current residence? ____(1) Own ____(2) Rent

21. What is your age?

____ (1) under 25
____ (2) 25 to 34
____ (3) 35 to 44
____ (4) 45 to 54
____ (5) 55 to 64
____ (6) 65+

22. What best describes your level of education?

____(1) Less than High School
____(2) High School or GED equivalent
____(3) Some college/technical school
____(4) Technical school certification/Assoc degree
____(5) College Graduate
____(6) Post graduate

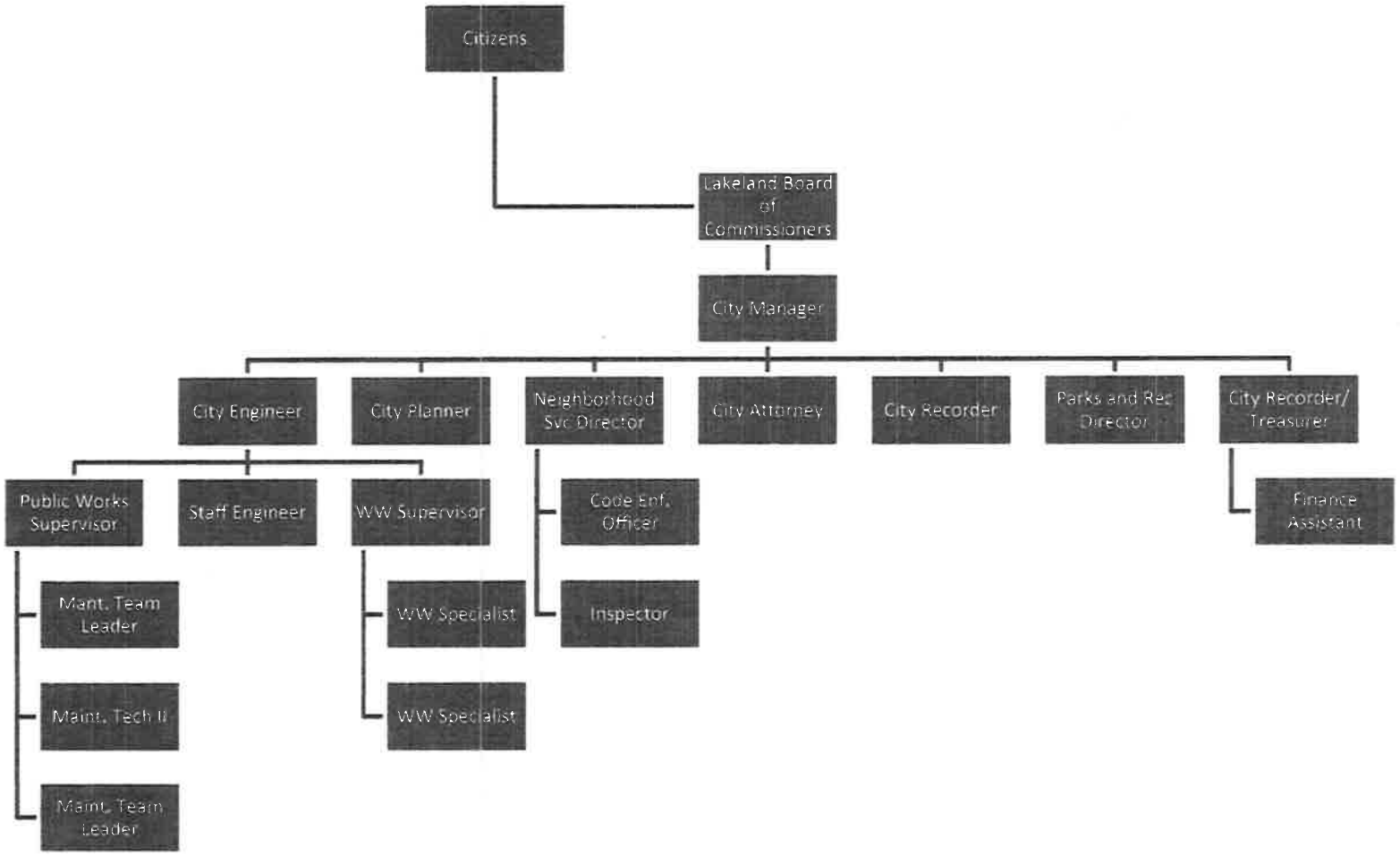
23. Which of the following best describes your current employment status?

____(1) employed outside the home
Where do you work?
___(1) In Lakeland
___(2) Bartlett
___(3) Germantown
___(5) Memphis
___(6) Elsewhere in Shelby County
___(4)Collierville
____(2) employed in the home
____(3) student
____(4) retired
____(5) not currently employed outside the home

24. Your gender: ___(1) Male ___(2) Female

THANKS FOR YOUR HELP - THIS CONCLUDES THE SURVEY!

Attachment #8: City of Lakeland Organizational Chart


Citizens
Lakeland Board of Commissioners
City Manager
City Engineer
City Planner
Neighborhood Svc Director
City Attorney
City Recorder
Parks and Rec Director
City Recorder/ Treasurer
Public Works Supervisor
Staff Engineer
WW Supervisor
Code Enf. Officer
Finance Assistant
Mant. Team Leader
WW Specialist
Inspector
Maint. Tech II
WW Specialist
Maint. Team Leader

CHAPTER 6

STORM WATER MANAGEMENT AND POLLUTION CONTROL PLAN

SECTION

18-601. General provisions.
18-602. Illicit discharges.
18-603. Construction activity and erosion and sediment control.
18-604. Storm water management infrastructure.
18-605. Storm water discharges from regulated industrial sources.
18-606. Enforcement and abatement.

18-601. General provisions. (1) Objectives. The objectives of this ordinance are:

(a) To protect public health, safety and general welfare.

(b) To eliminate any non-allowable discharges from the City of Lakeland's MS4 that adversely impact water quality.

(c) To provide for the sound use and development of all floodprone areas in such a manner as to maximize beneficial use without increasing flood hazard potential or diminishing the quality of the natural storm water drainage resources.

(d) To provide for sound fiscal management of the community by providing appropriate fees and other dedicated funding sources for the administration of the storm water management program.

(e) To increase the awareness of the public, property owners and potential homebuyers regarding storm water impacts (i.e. flooding, erosion, pollution).

(f) To minimize storm water damage to public facilities and utilities such as water and gas mains; electric, telephone, storm and sanitary sewer lines; and streets and bridges.)

(g) To promote a functional public and private storm water management system that will not result in excessive maintenance costs.

(h) To encourage the use of natural and aesthetically pleasing design that maximizes preservation of natural areas.

(i) To promote the use of comprehensive watershed management plans.

(j) To encourage preservation of floodplains, floodways and open spaces.

(k) To encourage community stewardship of the City of Lakeland's water resources.

(l) It is further the purpose of this ordinance to enable the City of Lakeland to comply with the NPDES permit and applicable regulations for storm water discharges.

(2) Conflict. All other ordinances related to storm water management and pollution control or parts of said ordinances inconsistent or conflicting with any part of this ordinance are hereby repealed to the extent of such inconsistency or conflict and this ordinance shall govern.

(3) Severability. If any provision of this ordinance or its application to any person, entity, or property is held invalid, the remainder of the ordinance or the application of the provision to other persons or property shall not be affected. Should any article, section, subsection, clause or provision of this ordinance be declared by a court of competent jurisdiction to be unconstitutional or invalid, such decision shall not affect the validity of the ordinance as a whole or any part thereof other than the part declared to be unconstitutional or invalid, each article, section clause and provision being declared severable.

(4) Definitions. For the purpose of this ordinance, unless specifically defined below, words or phrases shall be interpreted so as to give them the meaning they have in common usage and to give this article its most effective application. Words in the singular shall include the plural, and words in the plural shall include the singular. Words used in the present tense shall include the future tense. The word "shall" connotes mandatory and not discretionary; the word "may" is permissive.

(a) "Accidental discharge" - means a discharge prohibited by this ordinance into the City of Lakeland MS4 that occurs by chance and without planning or consideration prior to occurrence.

(b) "Best management practices (BMPs)" - means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of storm water runoff. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage.

(c) "Clean Water Act or the Act" - means the Federal Water Pollution Control Act, as amended, codified at 33 U.S.C. 1251 et seq.

(d) "Commercial" - means property devoted in whole or part to commerce, that is, the exchange and buying and selling of commodities or services. The term shall include, by way of example, but not be limited to the following businesses: amusement establishments, animal clinics or hospitals, automobile service stations, automobile dealerships for new or used vehicles, automobile car washes, automobile and vehicular repair shops, banking establishments, beauty and barber shops, bowling alleys, bus terminals, and repair shops, camera shops, dental offices or clinics, day care centers, department stores, drug stores, funeral homes, furniture stores, gift shops, grocery stores, hardware stores, hotels, jewelry stores, laboratories, laundries, and dry cleaning establishments, liquor stores, medical offices and clinics, motels, movie theaters, office buildings, paint stores or shops, parking lots, produce markets, professional offices, radio stations, repair establishments, retail stores,

television stations and production facilities, theaters, truck or construction equipment service stations, truck or construction equipment dealerships for new or used vehicles, truck or construction equipment washing facilities and truck or construction equipment repair shops.

(e) "Construction activity" shall mean any clearing, grading, excavating, or equipment usage that will result in the disturbance of the land surface and is subject to storm water permit requirements under the State of Tennessee General Permit for Storm Water Discharges Associated with Construction Activity. The term shall not include:

(i) Such minor construction activities as home gardens and individual home landscaping, home repairs, home maintenance work and other related activities that result in minor soil erosion;

(ii) Individual service and sewer connections for single or two family residences;

(iii) Agricultural practices involving the establishment, cultivation or harvesting of products of the field or orchard, preparing and planting of pasture land, forestry land management practices including harvesting, farm ponds, dairy operations, and livestock and poultry management practices and the construction of farm buildings;

(iv) Any project carried out under the technical supervision of the Natural Resources Conservation Service of the United States Department of Agriculture;

(v) Installation, maintenance, and repair of any underground public utility lines when such activity occurs in an existing hard surface road, street or sidewalk, provided the activity is confined to the area of the road, street or sidewalk which is hard surfaced and a street, curb, gutter or sidewalk permit has been obtained, and if such area is less than one acre of disturbance.

(f) "Critical design storm" - means the design storm specified in the Shelby County Storm Water Management Manual (SWMM).

(g) "Development" means any activity subject to the Tennessee General Permit for Construction Activities.

(h) "Engineer" - means the City of Lakeland City Engineer who is designated to supervise the operation of the storm water management program and who is charged with certain duties and responsibilities by this ordinance, or his/her duly authorized representative.

(i) "Erosion prevention and sediment control plan" - means a written plan, including drawings or other graphic representations, for the control of soil erosion and sedimentation resulting from a construction activity.

(j) "Impervious" - means not allowing the passage of water through the surface of the ground or ground covering or a substantial

reduction in the capacity for water to pass through the surface of the ground or ground covering.

(k) "Industrial facility" - is a business engaged in industrial production or service, that is, a business characterized by manufacturing or productive enterprise or a related service business. This term shall include but not be limited to the following: apparel and fabric finishers, automobile salvage and junk yards, blast furnace, blueprint and related shops, boiler works, cold storage plants, contractor's plants and storage facilities, foundries, furniture and household goods manufacturing, forge plants, greenhouses, manufacturing plants, metal fabrication shops, ore reduction facilities, planing mills, rock crushers, rolling mills, saw mills, smelting operations, stockyards, stone mills or quarries, textile production, utility transmission or storage facilities, truck or construction equipment salvage or junkyards, warehousing, and wholesaling facilities.

(l) "Institutional" - means an established organization, especially of a public or charitable nature. This term shall include, by way of example, but not be limited to, the following: churches, community buildings, colleges, day care facilities, dormitories, drug or alcohol rehabilitation facilities, fire halls, fraternal organizations, golf courses and driving ranges, government buildings, hospitals, libraries, kindergartens, or preschools, nursing homes, mortuaries, schools, social agencies, synagogues, parks and playgrounds.

(m) "Manager" - means the City of Lakeland City Manager.

(n) "Multi-family residential" - means an apartment building or other residential structure built for three or more units or lots under common ownership, and condominiums of three or more units.

(o) "National Pollutant Discharge Elimination System or NPDES permit" - means a permit issued pursuant to 33 U.S.C. Ordinance 26 Water Pollution Prevention and Control, subchapter IV Permits and Licenses, section 1342.

(p) "Notice of Intent or N.O.I." - means a written notice by the discharger to the Commissioner of the Tennessee Department of Environment and Conservation, or his/her designee, that a person wishes his/her discharge to be authorized under a general permit authorized by state law or regulation.

(q) "Person" - means any individual, partnership, copartnership, firm, company, trust estate, governmental entity or any other legal entity, or their legal representatives, agents or assigns. The masculine gender shall include the feminine, the singular shall include the plural where indicated by context.

(r) "Regional facility" - means a storm water management facility designed to serve more than two properties and 100 or more acres of drainage area. A regional facility typically includes a storm water pond.

(s) "Redevelopment" - any development subject to the Tennessee General Permit for Construction Activities.

(t) "Significant spills" - releases of oil or hazardous substances in excess of reportable quantities under section 311 of the Clean Water Act (at 40 CFR 110.10 and CFR 117.21) or section 102 of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), (at CFR 302.4).

(u) "Storm water" - refers to water induced or created from precipitation whether rain, snow or ice and either stored, collected, detained, absorbed, or discharged.

(v) "Storm water management facility" - means a storm water management control device, structure, or system of such physical components designed to treat, detain, store, convey, absorb, conserve, protect, or otherwise control storm water.

(w) "Storm water management" - means the collection, conveyance, storage, treatment and disposal of storm water in a manner to meet the objectives of this ordinance and its terms, including, but not be limited to measures that control the increase volume and rate of storm water runoff and water quality impacts caused or induced by manmade changes to the land.

(x) "Storm water management manual (SWMM)" - means the guidance document adopted for use by Shelby County. The manual provides the technical standards and information necessary for proper design and construction of storm water management facilities and the management of storm water management infrastructure as defined in § 18-604.

(y) "Storm water management plan or SWMP" - means the set of drawings and other documents that comprise all of the information and specifications for the programs, drainage systems, structures, BMPs, concepts, and techniques for the City of Lakeland and as part of this ordinance.

(z) "Storm water pollution prevention plans" - means a written site specific plan to eliminate or reduce and control the pollution of storm water through designed facilities, natural or constructed, and best management practices.

(aa) "Storm water sewer system" - means the network of conveyances and/or storage facilities that collect, detain, absorb, treat, channel, discharge, or otherwise control the quantity and quality of storm water.

(bb) "Stream" - means any river, creek, slough and/or natural water-course in which water usually flows in a defined bed or channel. It is not essential that the flowing be uniform or uninterrupted. The fact that some parts of the bed have been dredged or improved does not prevent the water-course from being a stream. For the purposes of this

ordinance, a stream is not a "wet weather conveyance" as also defined herein. Typically, streams are identified on USGS maps by solid blue lines and intermittent streams are depicted by dashed blue lines.

(cc) "Toxic pollutant" - means any pollutant or combination of pollutants listed as toxic in 40 CFR Part 401 promulgated by the Administrator of the Environmental Protection Agency under the provisions of 33 U.S.C. 1317.

(dd) "Variance" - means the modification of the minimum storm water management requirements contained in this ordinance and the storm water management plan for specific circumstances where strict adherence of the requirement would result in unnecessary hardship and not fulfill the intent of this ordinance.

(ee) "Water quality" - means characteristics that are related to the physical, chemical, biological, and/or radiological integrity of storm water.

(ff) "Watershed management program" - means a balanced program and plan of controlling the quantity and quality of water resources through comprehensive land and water resource management. Such management includes but is not limited to pollution control, land development controls, best management practices both structural and non-structural, preservation, habitat protection, and well-head protection. This program incorporates the state's NPDES storm water quality permit program within such watersheds or portions thereof as are located inside Lakeland's geographical boundaries.

(gg) "Watershed master plan" - means the guidance vehicle for implementing the "watershed management program."

(hh) "Waterway buffer" - means an area including trees, shrubs, and herbaceous vegetation that exists or is established to protect and separate a stream, waterway, lake, reservoir, or pond or other body of water from buildings and/or structures and other land uses that alter habitat, geomorphology, water quality, and hydrology.

(ii) "Wet weather conveyance" - as defined in Rule 1200-4-3-.04 of the Rules of the Tennessee Department of Environment and Conservation. Wet weather conveyances are man made or natural water courses, including natural water courses that have been modified by channelization, that flow only in direct response to precipitation runoff in their immediate locality, the channels of which are above the groundwater table and which do not support fish or aquatic life and are not suitable for drinking water supplies. Rule 1200-4-3-.02(7) requires that waters designated as wet weather conveyances shall be protective of wildlife and humans that may come in contact with them and maintain standards applicable to all downstream waters. No other use classification or water quality criteria apply to these waters.

(5) Abbreviations. (a) CERCLA - means the Comprehensive Environmental Response, Compensation and Liability Act in its original form or as amended.

(b) CFR - Code of Federal Regulations

(c) FEMA - Federal Emergency Management Agency

(d) MS4 - Municipal Separate Storm Sewer System means the City of Lakeland separate storm water system both natural and manmade as may be subject to the NPDES Storm Water Permit for the City of Lakeland.

(e) SWPPP - Storm Water Pollution Prevention Plan

(f) TCA - Tennessee Code Annotated (latest version)

(g) TNCGP - Tennessee Construction General Permit

(h) TMSP - Tennessee Multi-Sector Permit for storm water discharges associated with industrial activity (see § 18-605 (2))

(i) U.S.C - means United States Code

(j) WMM - Watershed Management Manual.

(as added by Ord. #04-67, July 2004)

18-602. Illicit discharges. (1) Unauthorized discharge a public nuisance. Discharge of storm water in any manner in violation of this ordinance; or any violation of any condition of a permit issued pursuant to this ordinance; or any violation of any condition of a storm water discharge permit issued by the State of Tennessee Department of Environment and Conservation is hereby declared a public nuisance and shall be corrected or abated.

(2) Improper disposal and illicit discharges. (a) It shall be unlawful for any person to improperly dispose any contaminant into the City of Lakeland MS4. Contaminants include, but are not limited to the following:

(i) Trash or debris;

(ii) Construction materials;

(iii) Petroleum products including but not limited to oil, gasoline, grease, fuel oil, or hydraulic fluids;

(iv) Antifreeze and other automotive products;

(v) Metals in either particulate or dissolved form;

(vi) Flammable or explosive materials;

(vii) Radioactive material;

(viii) Batteries, including but not limited to, lead acid automobile batteries, alkaline batteries, lithium batteries, or mercury batteries;

(ix) Acids, alkalis, or bases;

(x) Paints, stains, resins, lacquers, or varnishes;

(xi) Degreasers and/or solvents;

(xii) Drain cleaners;

(xiii) Pesticides, herbicides, or fertilizers;

(xiv) Steam cleaning wastes;

(xv) Soaps, detergents, or ammonia;

(xvi) Swimming pool backwash including chlorinated swimming pool discharge;

(xvii) Chlorine, bromine, and other disinfectants;

(xviii) Heated water;

(xix) Animal waste from commercial animal or feeder lot operations;

(xx) Any industrial and sanitary wastewater, including leaking sewers or connections;

(xxi) Recreational vehicle waste;

(xxii) Animal carcasses;

(xxiii) Food wastes;

(xxiv) Medical wastes;

(xxv) Collected lawn clippings, leaves, branches, bark, and other fibrous materials;

(xxvi) Collected silt, sediment, or gravel;

(xxvii) Dyes, except as stated in subsection (b);

(xxviii) Chemicals, not normally found in uncontaminated water;

(xxix) Any hazardous material or waste, not listed above;

(xxx) Washing of fresh concrete for cleaning and/or finishing purposes or to expose aggregates;

(xxxi) Junk motor vehicles, as defined in subsection (c);

(xxxii) Liquid from solid waste disposal containers.

Penalties for minor discharges that have no significant adverse impact on safety, health, the welfare of the environment, or the functionality of the city's storm water collection system may be waived at the discretion of the engineer.

(b) Dye testing. Dye testing is allowed but requires verbal notification to the engineer a minimum of twenty-four (24) hours prior to the date of the test. The City of Lakeland governmental agencies are exempt from this requirement.

(c) Junk motor vehicles, definition thereof. "Junk motor vehicle" means any vehicle which shall include by way of example but not be limited to the following vehicle types: automobiles, construction equipment, motorcycles, and trucks, which meets all of the following requirements:

(i) Is three years old or older;

(ii) Is extensively damaged, such damage including, but not limited to any of the following: A broken window or windshield or missing wheels, engine or transmission;

(iii) Is apparently inoperable;

(iv) Is without a valid current registration;

(v) Has a fair market value equivalent only to the value of the scrap in it.

(3) Exceptions, allowable discharges. The following types of discharges shall not be considered prohibited discharges for the purpose of this ordinance unless the engineer has determined that the type or quantity of discharge, whether singly or in combination with others, is causing significant contamination of the City of Lakeland MS4.

(a) Potable water;

(b) Potable water line flushing;

(c) Air conditioning condensate;

(d) Discharges from emergency fire fighting activities and exercises (A storm water pollution prevention plan should be prepared to address discharges or flows from fire fighting only where such discharges are identified as significant sources of pollutants to waters of the United States);

(e) Uncontaminated water from crawl space, pumps or footing drains;

(f) Lawn watering;

(g) Golf course watering;

(h) Residential car and boat washing;

(i) De-chlorinated swimming pool water;

(j) Materials placed as part of an approved habitat restoration or bank stabilization project;

(k) Rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, uncontaminated springs, diverted stream flows; riparian habitats and wetlands;

(l) Flows from riparian habitats and wetlands;

(m) Common practices for water well disinfections;

(n) Discharges within the constraints of a National Pollutant Discharge Elimination System (NPDES) permit from the Tennessee Department of Environment and Conservation (TDEC);

(o) Unless otherwise prohibited by this ordinance, any discharge that could be made directly to "Waters of the State" without a federal or state permit being required;

(p) Dye testing in compliance with § 18-602(2);

(q) Other types of discharges as determined by the engineer.

(4) Illicit connection, defined. Any connection, existing or future, identified by the engineer, as that which could convey anything not composed entirely of storm water directly to the City of Lakeland MS4 is considered an illicit connection and is prohibited with the following exceptions:

(a) Connections conveying allowable discharges as defined in § 18-602(3).

(b) Connections conveying discharges pursuant to an NPDES permit (other than an NPDES storm water permit). Existing illicit connections must be stopped, at owner's expense.

(5) Monitoring and inspection. (a) Monitoring. The engineer shall periodically monitor compliance of the storm water NPDES permit holder.

(b) Detection of illicit connections and improper disposal. The engineer shall take appropriate steps to detect and eliminate illicit connections to the City of Lakeland MS4, including the adoption of programs to identify illicit discharges and their source or sources and provide for public education, public information and other appropriate activities to facilitate the proper management and disposal of used oil, toxic materials and household hazardous waste.

(c) Inspections. (i) The engineer or his/her designee, bearing proper credentials and identification, may enter and inspect properties for inspections, investigations, monitoring, observation, measurement, enforcement, sampling and testing, to effectuate the provisions of this ordinance, the storm water management plan, and/or the NPDES storm water permit. The engineer or his/her designee shall duly notify the owner of said property or the representative on site and the inspection shall be conducted at reasonable times.

(ii) Upon refusal by any property owner to permit an inspector to enter or continue an inspection, the inspector shall terminate the inspection or confine the inspection to areas wherein no objection is raised. The inspector shall immediately report the refusal and the circumstances to the engineer. The engineer may seek appropriate action.

(iii) In the event the engineer or his/her designee reasonably believes that discharges into the City of Lakeland MS4 may cause an imminent and substantial threat to human health or the environment, the inspection may take place at any time and without notice to the owner of the property or a representative on site. The inspector shall present proper credentials upon request by the owner or representative.

(iv) At any time during the conduct of an inspection or at such other times as the engineer or his/her designee may request information from an owner or representative, the owner or representative may identify areas of the facility or establishment, material or processes which contains or may contain a trade secret. If the engineer or his/her designee has no clear and convincing reason to question such identification, the inspection report shall note that trade secret information has been omitted. To the extent practicable, the engineer shall protect all information that is

designated as a trade secret by the owner or their representative. (as added by Ord. #04-67, July 2004)

18-603. Construction activity and erosion and sediment control. (1) Construction activity. All construction activity, defined below, shall be in compliance with all applicable requirements under this section.

If one (1) or more acres of land are disturbed or planned to be disturbed as part of a larger plan by construction activity, an application shall be applied for under the "State of Tennessee's General Permit for Storm Water Discharges Associated with Construction Activity". The State of Tennessee utilizes a "Notice of Intent" for dischargers to obtain coverage under the general permit program for discharges associated with construction activities. These documents are subject to change and amendment and therefore the user should obtain the latest versions directly from the State of Tennessee Department of Environment and Conservation, Division of Water Pollution Control.

If a Tennessee General NPDES Permit is applied for, a copy of the Notice of Coverage (N.O.C.) shall be sent by certified mail, hand delivered or as directed by the engineer to the manager of the storm water management section at least 30 days prior to the commencement of construction activities (i.e. the initial disturbance of soils associated with clearing, grading, excavating, or other construction activities). A copy of the NOC shall also be available for inspection by the engineer or engineer's representative on the construction site at all times during which construction activities are in progress. To seek coverage under the Tennessee Department of Environment and Conservation General Permit, the N.O.I. shall be submitted to the following address:

Tennessee Department of Environment and Conservation
Division of Water Pollution Control, Memphis Environmental Assistance Center
Storm Water NOI Processing
2510 Mt. Moriah, Suite 645
Memphis, TN 38115-1520

The copy of the N.O.C. shall be sent to the following address:

City Engineer
Lakeland City Hall
10001 Highway 70
Lakeland, TN 38002

(2) Construction activity, regulated. (a) It shall be unlawful for any person to permit any discharge of storm water originating from land owned or controlled by them from a construction activity on a total land area of one (1) or more acres disturbed by construction activity or less

than one (1) acre if part of a larger common plan of development of at least one acre, without a general permit for storm water discharges associated with construction activity from the Tennessee Department of Environment and Conservation, with a copy of the N.O.C. provided to the storm water management section at the same address listed in § 18-603(1).

(b) Exempted construction activity. The following activities may be undertaken without formal notice; however, the persons conducting these excluded activities shall remain responsible for otherwise conducting those activities in accordance with the provisions of this ordinance and other applicable law including responsibility for controlling sedimentation and runoff.

(i) Such minor construction activities as home gardens and individual home landscaping, home repairs, home maintenance work and other related activities that result in minor soil erosion;

(ii) Individual service and sewer connections for single or two family residences;

(iii) Agricultural practices involving the establishment, cultivation or harvesting of products of the field or orchard, preparing and planting of pastureland, forestry land management practices (refer also to the Lakeland Tree Management Ordinance (03-36) including harvesting, farm ponds, dairy operations, and livestock and poultry management practices and the construction of farm buildings;

(iv) Any project carried out under the technical supervision of the Natural Resources Conservation Service of the United States Department of Agriculture;

(v) Installation, maintenance, and repair of any underground public utility lines when such activity occurs in an existing hard surface road, street or sidewalk, provided the activity is confined to the area of the road, street or sidewalk which is hard surfaced and a street, curb, gutter or sidewalk permit has been obtained;

(vi) Construction of a single family residence in which the lot owner is the proposed resident.

(c) Best management practices guide for construction activities. The minimum standards for controlling erosion and sedimentation from the discharge of storm water from a construction activity, are set forth in the City of Lakeland Erosion Control Handbook as may be adopted and amended from time to time. The ordinance sets forth the TDEC Erosion and Sediment Control Handbook as the manual governing minimum standards. Such adoption or amendment shall be by resolution of the Lakeland Board of Commissioners. A copy of this handbook will be

maintained on file in the offices of the city engineer and can be found on TDEC's website. The specific application of BMP practices is subject to approval of the city engineer. A copy of the storm water pollution prevention plan (SWPPP) required by applicable construction permits shall be available to the city engineer as a part of the approval process. Approval of the construction project will be subject to a favorable review by the city engineer and the Tennessee Department of Environment and Conservation.

(3) Compliance with permits. Construction shall only be allowed when permitted by applicable construction permits and when construction plans have been approved by the engineer, when deemed appropriate by the code enforcement official and/or the engineer. The engineer may stop construction on properties, or administer other enforcement actions as defined in this ordinance that do not have adequate erosion prevention and sedimentation control measures. (as added by Ord. #04-67, July 2004)

18-604. Storm water management infrastructure.

(1) Infrastructure, defined. Storm water management infrastructure consists of the entire physical system of storm water management both publicly and privately owned. This system consists of both man made and natural components as well as rivers, streams, creeks, lakes, reservoirs, ponds, springs, wetlands, wells and including features defined by the State of Tennessee as "waters of the state".

(2) Policy statements for development. Minimum standards and procedures for the design, construction, operation, and maintenance of the storm water management infrastructure shall be set forth in the City of Lakeland Watershed Management Manual (WMM) as may be adopted and amended from time to time. Until such time as said document is adopted, the Shelby County WMM, located in the engineer's office, shall be used. If said Shelby County document has not yet been adopted by the county, the City of Memphis Drainage Design Manual shall be used, together with such revisions as may have been adopted by the City of Lakeland by resolution of the board of commissioners. A copy of the currently relevant management manual will be maintained on file in the offices of the engineer.

The following general policy statements shall apply:

(a) All development in the City of Lakeland shall be subject to the provisions of this ordinance.

(b) Proposed plans for construction shall be stamped by a professional engineer, licensed in the State of Tennessee. This shall include all proposed improvements or modifications to the existing or new storm water infrastructure, erosion prevention and sediment control practices, and other related improvements or modifications.

(c) An "as built" plan, certified by a licensed professional engineer as appropriate, must be submitted in a format acceptable to the

engineer upon completion of the public or private storm water management facility. The licensed professional shall certify that: the facilities have been constructed in substantial and essential conformance to the design plan.

(d) Each individual project shall be evaluated for consistency with the adopted watershed master plan, when available, for the major watershed or watersheds within which the project site is located. The individual project evaluation will determine if storm water quantity and quality management practices can adequately serve the property and limit impacts to downstream public and private properties. The presence of a regional facility(s) will be considered in determining the extent to which quantity and/or quality controls will be necessary.

(e) In the absence of such a storm water quantity and/or quality master plan, a system of uniform requirements shall be applied to each individual project site. In general, these uniform requirements may be based on the criterion that post-development storm water peak runoff, and water quality must not differ significantly from pre-development conditions.

(f) Under no circumstances shall a site be graded or drained in such a way as to increase surface runoff to sinkholes, "dry wells" or "drainage wells".

(g) Development of properties containing existing on-site storm water management facilities may be permitted, at the discretion of the city engineer, provided the property and downstream public and private properties, infrastructure or "Waters of the State" are adequately protected from adverse storm water impacts.

(h) Erosion or sedimentation, or transport of other pollutants or forms of pollution, due to various land development activities must be controlled.

(i) Soil bioengineering, "green" and other "soft" slope and stream bank stabilization methods are encouraged over rip-rap, concrete and other hard armoring techniques. The use of greenway right-of-ways for appropriate properties is encouraged.

(j) A waterway buffer shall be applied to all major waterways serving more than 100 acres of tributary area or as specified in the City of Lakeland Streamside Management Buffer Requirements, Ordinance 03-51. No new construction of any building or structure shall be permitted in the buffer except as may be permitted by the city engineer and supported with adequate technical and environmental analysis and appropriate mitigation measures. For example, mitigation strategies may include:

- Publicly dedicated Greenways
- Restoration of impacted waterways with bioengineering or "green" approaches

- New and innovative technologies applied to address water quantity or quality

Modification to density, trees or other development requirements subject to acceptance by the City Engineer and City of Lakeland Planning Department.

(3) Infrastructure maintenance. It shall be the responsibility of the property owner of record for the maintenance of storm water infrastructure until such infrastructure is accepted by the City of Lakeland. Maintenance of storm water infrastructure shall consist of no less than the following: outlet cleaning, mowing, herbicide spraying, litter control, removal of sediment from basin and outlet control structures, and repair of drainage structures. All such activities will be conducted in an environmentally sound manner and consistent with applicable codes, rules, and standards.

(4) Maintenance responsibility - privately owned infrastructure.

(a) Any storm water management facility, including buffers, that is privately owned, shall receive general routine maintenance (i.e. controlling vegetative growth, removing sediment and debris) provided for by the owner(s).

(b) The owner(s) shall maintain a perpetual right of access for inspection and emergency access by the city. The city has the right, but not the duty to enter premises for inspection and emergency repairs.

(c) Any storm water management facility that services commercial and industrial development shall be maintained.

(d) Maintenance requirements may also be prescribed by a site-specific agreement between the owner or operator and the City of Lakeland. These agreements shall be based on an approved site design, a storm water pollution prevention plan, an inspection program, a long-term maintenance plan, an emergency repair plan, easements, and proof or surety of financial responsibility. A sample stormwater facilities maintenance agreement is appended hereto.[1] This form is illustrative and not strictly prescriptive. The city may amend its specific provisions as may be appropriate.

If privately owned infrastructure is not maintained, the city manager upon advice of the engineer may assess a fine on the private owner(s) as detailed in § 18-606 of this ordinance. Such a fine will be used for cost recovery, to abate damages, and to restore impacted areas.

(5) Maintenance responsibility - publicly owned infrastructure.

(a) All regional storm water management control facilities proposed by the owners, if accepted by the engineer and approved by the City of Lakeland Board of Commissioners for dedication as a public regional facility, shall be publicly owned and/or maintained.

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[1]All attachments to Ord. #04-67 are of record in the recorders office.

(b) All other storm water management control facilities shall be publicly owned and/or maintained only if accepted for maintenance by the board of commissioners. (as added by Ord. #04-67, July 2004)

18-605. Storm water discharges from regulated industrial sources. (1) Purpose. It is the purpose of this ordinance to control storm water runoff from industrial sources in order to minimize, to the maximum extent practicable, pollutants discharged from industrial sources into the City of Lakeland MS4. This reduction may be achieved by a combination of management practices, control techniques, system design, engineering methods and plan review.

(2) Industry, defined. An industrial facility is one defined as industry by EPA or subject to the Tennessee Multi-Sector Permit (TMSP) for Storm Water Discharges Associated with Industrial Activity.

(3) Right of inspection, defined. Right of inspection is defined in § 18-602(5)(c) of this ordinance.

(4) Information required. The State of Tennessee utilizes a "Notice of Intent" for dischargers to obtain coverage under the general permit program for discharges associated with industrial activities. These documents are subject to change and amendment and therefore the user should obtain the latest versions directly from the State of Tennessee Department of Environment and Conservation, Division of Water Pollution Control. These may be obtained at the state's web page: www.state.tn.us/environment/permits. All industries subject to the TMSP and discharging into the City of Lakeland storm sewer system shall maintain a copy of the storm water pollution prevention plan (SWPPP) on the industrial site, available for inspection and copying at reasonable times by the engineer.

(5) Storm water pollution prevention plan (SWPPP) requirements. The storm water pollution prevention plan (SWPPP) must follow, at a minimum, the outline of the plan listed in the Tennessee Multi-Sector Permit language or a facility's NPDES storm water permit language, whichever is applicable.

(6) Sampling at industrial facilities. (a) Samples of storm water collected for compliance monitoring shall be representative of the discharge. Sampling locations will be those defined in the Tennessee Multi-Sector Permit or an NPDES permit. Sampling and analyses shall be in accordance with 40 CFR Part 122.21 and 40 CFR Part 136 and/or applicable permit language.

(b) Samples that may be taken by the engineer and/or his/her designated representatives for the purpose of determining compliance with the requirements of this ordinance or rules adopted hereunder may be split with the discharger if requested before the time of sampling.

(c) The engineer may require a storm water discharger to install and maintain at the discharger's expense a suitable manhole or sampling facility at the discharger's facility or suitable monitoring access

to allow observation, sampling, and measurement of all storm water runoff being discharged into the city storm sewer system. Sampling manhole or access shall be constructed in accordance with plans approved by the engineer and shall be designed so that flow measurement and sampling equipment can be installed. Access to the manhole or monitoring access shall be available to the engineer and/or his/her designated representatives at all times.

(7) Reporting. (a) Any facility required to sample under either the TMSP or an NPDES storm water permit shall provide a copy of the monitoring report to the engineer.

(b) The engineer may require reporting by dischargers of storm water runoff to the storm water system, where an NPDES storm water permit is not required, to provide information. This information may include any data necessary to characterize the storm water discharge.

(8) Accidental discharges. In the event of a "significant spill" as defined in "definitions" or any other discharge which could constitute a threat to human health or the environment, the owner or operator of the facility shall give notice to the engineer and the local field office of the Tennessee Department of Environment and Conservation as required by state and federal law following the accidental discharge.

If an emergency response by governmental agencies is needed, the owner or operator should also call the Memphis and Shelby County Emergency Management Agency, immediately to report the discharge. A written report must be provided to the engineer within five (5) days of the time the discharger becomes aware of the circumstances, unless this requirement is waived by the engineer for good cause shown on a case-by-case basis, containing the following particulars:

(a) A description of the discharge, including an estimate of volume.

(b) The exact dates, times and duration of the discharge.

(c) Steps being taken to eliminate and prevent recurrence of the discharge, including any planned modification to contingency, SWPPP or maintenance plans.

(d) A site drawing should be rendered that shows the location of the spill on the impacted property, the direction of flow of the spill in regards to the topographical grade of the property, the impacted watercourse(s), and the property or properties adjacent to the spill site.

(e) The discharger shall take all reasonable steps to minimize any adverse impact to the City of Lakeland MS4, including such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge. The interruption of business operations of the discharger shall not be a defense in an enforcement action necessary to maintain water quality and minimize any adverse impact that the discharge may cause.

(f) It shall be unlawful for any entity, whether an individual, residential, commercial or industrial entity to fail to comply with the provisions of ths section.

(9) Fraud and false statements. Any reports required by this ordinance or rules adopted hereunder and any other documents required by the city to be submitted or maintained by the discharger shall be signed by a responsible corporate official and certified as accurate to the best of their personal knowledge after appropriate investigation. It shall be subject to the enforcement provisions of this ordnance and any other applicable local and state laws and regulations pertaining to fraud and false statements. Additionally, the discharger shall be subject to the provisions of 18 U.S. Code Section 309 of the Clean Water Act, as amended, governing false statements and responsible corporate officials. (as added by Ord. #04-67, July 2004)

18-606. Enforcement and abatement. (1) Administrative remedies. The enforcement remedies enumerated herein shall be applicable to all sections of this ordinance.

(a) Notification of violation. Whenever the engineer finds any permittee or person discharging storm water, or other pollutants into the City of Lakeland MS4 or otherwise, has violated or is violating this ordinance, conditions of a storm water permit, or order issued hereunder, the engineer or his/her agent may serve upon said user written N.O.V. This notice shall be by personal service, or registered or certified mail with return receipt. Within ten (10) days of the receipt date of this notice, the recipient of this N.O.V. shall provide the engineer with a written explanation of the violation. The response shall also include a plan for satisfactory correction and prevention thereof, to include specified required actions and milestones for their completion. Submission of this plan in no way relieves the discharger of liability for any violations occurring before or after receipt of the notice of violation. The engineer will render a response within 20 days. If the City of Lakeland deems it necessary, a complaint may be filed with the Commissioner of the Tennessee Department of Environment and Conservation pursuant to Tennessee Code Annotated (T.C.A) number 69-3-118.

(b) Consent agreement. The engineer is hereby empowered to enter into consent agreements, assurances of voluntary compliance, or other similar documents establishing an agreement with the person or persons responsible for the non-compliance. Such agreements will include specific action to be taken by the permittee or person discharging storm water to correct the non-compliance within a time period specified by the agreements. Consent agreements shall have the same force and effect as compliance orders issued pursuant to paragraph (d) below.

(c) Compliance orders. When the engineer finds that any person has violated or continues to violate this ordinance or any order

issued hereunder, he may issue an order to the violator directing that, following a specified time period, adequate structures and/or devices be installed or procedures implemented and properly operated or followed. Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the non-compliance, including the construction of appropriate structures, installation of devices, self-monitoring and related management practices.

(d) Cease and desist orders. When the engineer finds that any person has violated or continues to violate this ordinance or any permit or order issued hereunder and such action or inaction has or may have the potential for immediate and significant adverse impact on the MS4 or the storm water discharges to it, the engineer may issue an order to cease and desist all such violations immediately and direct those persons in non-compliance to:

(i) Comply forthwith, or

(ii) Take such appropriate remedial or preventative action as may be needed to properly address a continuing or threatened violation, including halting operations and terminating the discharge.

(iii) Anyone receiving a cease and desist order that includes instruction to halt operations shall receive an expedited review and appeal of such order within two (2) business days.

(2) Civil penalty. Any person who performs any of the following acts or omissions shall be subject to a civil penalty as set out in Part II, Ordinance 1, Section 1-4, Code of the City of Lakeland per day for each day, or part thereof, during which the act or omission continues or occurs.

(a) Fails to obtain any required permit;

(b) Violates the terms and conditions of such required permit in (a) above;

(c) Violates a final determination or order of the engineer; or

(d) Violates any provision of this ordinance.

The city attorney, with consent and advice of the manager, engineer and the board of commissioners, may also initiate civil proceedings in any court of competent jurisdiction seeking monetary damages for any damages caused to the City of Lakeland MS4 by any person, and to seek injunctive or other equitable relief to enforce compliance, with any lawful orders of the engineer.

(3) Unlawful acts, misdemeanor. It shall be unlawful for any person to knowingly:

(a) Violate a provision of this ordinance;

(b) Violate the provisions of any permit issued pursuant to this ordinance;

(c) Fail or refuse to comply with any lawful notice to abate issued by the engineer, which has not been timely appealed to the city engineer within the time specified by such notice; or

(d) Violate any lawful order of the engineer within the time allowed by such order.

Such person shall be guilty of a misdemeanor; and each day of such violation or failure or refusal to comply shall be deemed a separate offense and punishable accordingly. Any person found to be in violation of the provisions of this ordinance shall be punished by a fine as set out in relevant statutes of the City of Lakeland. Upon learning of such act or omission, the engineer may issue a city ordinance citation charging the person, firm, or entity with violating one (1) or more provisions of this ordinance or permit issued thereunder, criminal violation of this ordinance may also be the basis for injunctive relief, with such actions being brought and enforced through the Shelby County General Sessions Environmental Court or such court of competent jurisdiction as may have been duly established by the City of Lakeland.

(4) Processing a violation. (a) The engineer may issue an assessment against any person or permittee responsible for the violation;

(b) Any person against whom an assessment or order has been issued may secure a review of such assessment or order by filing with the engineer a written petition setting forth the specific legal and technical grounds and reasons for his/her objections and asking for a hearing in the matter involved before the city engineer and if a petition for review of the assessment or order is not filed within thirty (30) days after the date the assessment or order is served, the violator shall be deemed to have consented to the assessment and it shall become final;

(c) Whenever any assessment has become final because of a person's failure to appeal the engineer's assessment, the city attorney may apply to the appropriate court for a judgment and seek execution of such judgment and the court, in such proceedings, shall treat a failure to appeal such assessment as a confession of judgment in the amount of the assessment;

(d) The engineer may consider the following factors when reviewing a petition:

(i) Whether the civil penalty imposed will be an appropriate economic deterrent to the illegal activity by the violator or others in the regulated community;

(ii) Damages to the city, including compensation for the damage or destruction of the City of Lakeland MS4, and also including any penalties, costs (direct or indirect) and attorneys' fees incurred by the city as a result of the illegal activity, as well as the expenses involved in enforcing this ordinance and the costs involved in rectifying any damages;

(iii) Cause of the discharge or violation;

(iv) The severity of the discharge and its effect on the City of Lakeland MS4;

(v) Effectiveness of action taken by the violator to cease the violation;

(vi) The technical and economic reasonableness of reducing or eliminating the discharge;

(vii) The economic benefit gained by the violator.

(e) Any civil penalty assessed to a violator pursuant to this section may be in addition to any civil penalty assessed by the Commissioner of the Tennessee Department of Environment and Conservation for violations of T.C.A. 69-3-115; however, the sum of penalties imposed by this section and by T.C.A. 69-3-115 shall not exceed ten thousand dollars ($10.000) per day during which the act or omission continues or occurs.

(f) Any appeal of this final determination shall be made to a court of competent jurisdiction. Such appeal must be filed within 15 days of the decision by the engineer.

(5) Appeal judicial proceedings and relief. The city attorney may, upon the advice of the engineer and board of commissioners, initiate proceedings in any court of competent jurisdiction against any person who has or is about to:

(a) Violate the provisions of this ordinance.

(b) Violate the provisions of any permit issued pursuant to this ordinance.

(c) Fail or refuse to comply with any lawful order issued by the engineer that has not been timely appealed within the time allowed by this ordinance.

(d) Violates any lawful order of the engineer within the time allowed by such order.

Any person who shall commit any act declared unlawful under this ordinance shall be guilty of a misdemeanor under state law as per TDEC regulations governing storm water permitting, and each day of such violation or failure shall be deemed a separate offense and punishable accordingly.

(6) Damages, disposition of funds. All damages collected under the provisions of this ordinance and civil penalties collected under the provisions of Section 30-149, following the adjustment for the expenses incurred in making such collections shall be allocated and appropriated to the Lakeland Storm Water Utility as may have been established by the City of Lakeland.

(7) Records retention. All dischargers subject to this ordinance shall maintain and preserve for no fewer than five (5) years, all records, books, documents, memoranda, reports, correspondence and any and all summaries thereof, relating to monitoring, sampling, and chemical analyses made by or in behalf of the discharger in connection with its discharge. All records which pertain to matters which are the subject of any enforcement or litigation activities brought by the city pursuant hereto shall be retained and preserved by the discharger until all enforcement activities have concluded and all periods of limitation with respect to any and all appeals have expired.

(8) Facilities maintenance agreement. The following "facilities maintenance agreement" is provided as a minimum guideline for agreements between City of Lakeland and owners/operators of storm water infrastructure not owned by the city.[1] (as added by Ord. #04-67, July 2004)

[1]All attachments to Ord. #04-67 are of record in the recorder's office.

II. Neighborhood Development Regulations
Section 10 - Stormwater Management

A. General Requirements.

1. Intent. This Section is intended to promote the protection of the City's natural environment, including drainageways, soils, topography, Open Water, and landscape, address the non-point source pollution aspects of the federal Clean Water Act, and to encourage the integration of stormwater management with the design of the built environment. The application of these standards shall serve the following goals.

a. Prevent or reduce erosion and flood damages.
b. Control runoff pollutants and improve water quality.
c. Protect aquatic and riparian habitat.
d. Recharge groundwater.
e. Preserve the natural and beneficial functions of watercourses streams, lakes, wetlands, Areas of Special Flood Hazard, and flood prone areas.
f. Simplify and reduce long-term maintenance obligations through better design.

2. Authority. This section is part of the Subdivision Regulations. Any modification from the requirements of these regulations requires a Subdivision Modification approval.

3. Applicability. The stormwater management standards of the Subdivision Regulations are intended to apply to any development site included within an application for Preliminary Plat, Construction Plans, or Final Plat, that is greater than or equal to the Size of Development, Redevelopment, or Land Disturbance indicated in Title 18, Chapter 6, Section 18-603 of the Lakeland Code, Storm Water Management And Pollution Control Ordinance.

4. Stormwater Management Plan. A Stormwater Management Plan is required for applicable developments in this section. The Stormwater Management Plan shall include, at a minimum, the following items.

a. Soils report based on Natural Resource Conservation Service Soils mapping and corresponding hydrologic soils groups. Include typical infiltration rates for each soil type. Map areas available and unavailable for stormwater infiltration.
b. Location of existing infrastructure features such as culverts, bridges, box culverts, detention ponds, and other downstream improvements within five hundred (500) feet of the proposed development.
c. Proposed natural drainage features and man-made structures necessary to meet the standards of these Land Development Regulations and other applicable stormwater requirements and standards.
d. Identify all existing drainage basins, associated wet weather conveyance systems, and blue line streams.
e. Delineated drainage areas for each of the proposed drainage features and structures.
f. Overland flow paths.
g. Easements locations.
h. A stormwater report describing the existing and proposed stormwater management system and the hydrologic and water quality analysis used to document conformance with these Land Development Regulations and other applicable stormwater requirements and standards.

5. Operation and Maintenance Plan. An Operations and Maintenance Plan shall be prepared for the stormwater management system. Modification of stormwater management systems, other than as necessary to maintain compliance with the Operations and Maintenance Plan, is not permitted.

a. The plan shall include, at a minimum, the following items.

(1) The Stormwater Management Plan.
(2) Inspection and maintenance tasks, including routine mowing, litter control, brush and vegetation control, and erosion and sediment control.
(3) A description of the dedicated sources of funding for the required maintenance and yearly estimates for the maintenance.
(4) Responsible parties for all maintenance.
(5) All items indicated in The Lakeland Municipal Code Title 13, Chapter 6, Section 18-604, Storm Water Management and Pollution Control Ordinance.

b. Vegetation Management. Naturally landscaped areas of detention and drainage facilities shall be maintained as Natural Landscape Areas. The Natural Landscape Areas provisions of the Lakeland Zoning Ordinance, Article III.5, Landscape Standards, as may be amended, are duplicated and incorporated by reference as part of the Subdivision Regulations. These areas shall be maintained via controlled burning every year, to control invasive weeds and promote healthy native vegetation. Where controlled burning is not feasible, mowing or other vegetation management measures shall be performed as needed.

B. General Design Principles.

Stormwater management systems are encouraged to utilize the following principles. Figures I.E.3, I.E.4, and I.E.5 illustrate potential systems on different scales.

1. Design and construction of stormwater management systems shall conform to all specifications and procedures established by the City by code, ordinance, or policy.

2. Treat Stormwater as a Valuable Resource. All stormwater shall be treated as a valuable resource not as a waste product. Stormwater shall be collected, stored, and reused to reduce surface water runoff.

3. Replicate Natural Hydrology. The stormwater management system shall replicate the pre- development natural hydrology of the site, protecting natural drainageways, following the natural topography of the site, and preserving the natural infiltration characteristics of the site.

4. Treat Stormwater Where It Falls. All stormwater shall be managed close to where it falls on the site, reducing the need for lengthy, single purpose conveyance.

5. Minimize Discharge. The system shall minimize surface water discharge in smaller, more frequent rainfall events, and minimize the downstream impact of larger, more intense rain events which are far less frequent.

6. Integrate Stormwater and Open Space. All stormwater management systems shall be an integral part of the neighborhood design and the open space design within the neighborhood, and shall serve the dual function of naturally managing the stormwater and creating usable open space. Applicable open space types of the Lakeland Zoning Ordinance are incorporated by reference into these subdivision regulations, and an applicable open space type shall be utilized.

7. Integrate with Natural Resource Management. The location and design of the stormwater management system shall be closely integrated with the City's Natural Resource Inventory and Assessment, to maintain and enhance the City's Natural areas, including respecting the unique geology, soils, landscape cover, slopes, and long-term maintenance objectives of Conservation Areas.

8. Stormwater Sewer System. Stormwater sewer systems shall be utilized as needed to convey heavy rainfall events beyond the requirements defined in herein, and at locations where naturalized stormwater treatment is infeasible.

9. System Design Hierarchy. The design of the stormwater management system for all sites shall use the following hierarchy of methods of managing stormwater.

a. Natural Resource Conservation. Preserve and do not negatively affect natural resource features of the development site, including wetlands, Open Water, and woodlands.
b. Existing Natural Drainageways. Preserve and do not negatively affect existing natural streams, channels, and drainageways.
c. Vegetated Swales. Primarily utilize open, vegetated Swales to convey stormwater runoff.
d. Natural Infiltration. Preserve the natural infiltration and storage characteristics of the site.
e. Water Quality Structures. As needed, utilize structural measures that provide water quality and quantity control.
f. Structural Conveyance. Utilize structural measures that provide only quantity control and conveyance in instances where vegetated Swales and natural infiltration are infeasible.

C. Design Standards.

1. Design of Stormwater Facilities. Minimum design standards for stormwater facilities shall follow the Memphis Shelby County Stormwater Design Manual, the City of Lakeland Subdivision Regulations, and The Lakeland Municipal Code, Title 13, Chapter 6, Storm Water Management and Pollution Control Ordinance, whichever is the more stringent. Detention Volumes and Maximum Release Rates are specified below.

2. Detention Volume. The required detention volume shall be that volume necessary, given the hydraulic characteristics of the primary outlet structure, to attenuate the post-development mass outflow of water from the structure from hour 11 to hour 18 of the 24-hour storm to a level not to exceed the pre-development mass outflow for the same time period for both the 2-year and 5-year, 24-hour storms.

3. Maximum Release Rate. The release rate from any detention facility shall be for the site for the same storm prior to the proposed development. The peak outflow rate from the 2 year-24 hour storm, 10 year- 24 hour storm and 25 year-24 hour storm shall not exceed that of the site prior to development. Detention facilities shall have a primary discharge structure capable of accommodating the 24-hour storms up through the 25-year with an emergency overflow capable of handling at least the 100-year, 24-hour post-development discharge unless waived by the Planning Commission.

4. Storm Sewer Design Requirements. Design storm frequency for land use/development type for storm sewer systems shall be as follows:

(a) Residential - 25 years;
(b) Commercial/business/industrial - 25 years;

For drainage swales, lined channels, and natural channels the system shall be designed to carry the 100 year 24 hour storm and have the capacity to convey storm runoff without life hazard or property damage.
The methodology for hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms is specified in the Memphis Shelby County Stormwater Design Manual.

5. Conservation Area Requirements. Refer to the Subdivision Regulations, Conservation Area Requirements section. No stormwater management facilities shall be located within a Conservation Area Type A open space, nor shall they be permitted with designs that are detrimental to such open spaces.

6. Existing Water Features. Existing streams, lakes, and wetlands shall not be modified for use as stormwater detention or retention.

a. On-stream impoundments shall be prohibited.
b. Stream Buffer Requirements. Refer to the Zoning Ordinance Streamside Management Buffers section. No stormwater management facilities shall be located within streamside buffers, nor shall they be detrimental to such buffers, unless a plan with appropriate mitigation is authorized by the MPC.
c. Drainage to Lakes and Wetlands. Site drainage patterns shall not be substantially altered to decrease or increase the tributary area to lakes or wetlands.
d. Existing wetlands shall not be used as stormwater detention basins.
e. Existing wetlands shall not be modified for the purposes of stormwater management facilities unless it is demonstrated that the existing wetland is low in quality and the proposed modifications shall maintain or improve its habitat and ability to perform beneficial functions.
(1) Low quality wetlands are those that have been substantially disturbed, usually reflected in low native species diversity and habitat quality.
(2) All runoff shall be pretreated prior to discharge and the runoff shall enter the wetland as subsurface flow.

7. Easement Standards. Easements and/or Rights-of- Way for stormwater facilities shall be of sufficient width to permit installation, maintenance, or repair within the confines of the Easement or Right-of- Way without relocation of or other unreasonable interference with other public utilities. Easements shall be granted to the City of Lakeland or another party defined in the Operations and Maintenance Plan as the party responsible for maintenance. Also refer to the Subdivision Regulations, Utility Standards, II.9.

8. Stormwater detention and surface infiltration basins shall be designed as naturalized basins for multiple uses including stormwater detention, habitat enhancement, and passive recreational use. Basins shall not be designed solely for stormwater detention purposes.

a. Stormwater basins shall be designed and incorporated into a usable Open Space Type, accessible and open to the public (refer to III.4 Open Space Types).

b. Basins shall be planted with native or vegetation adapted to the area, suitable for the hydrologic conditions expected within the volume level of the basin to accommodate the two (2) year storm.

c. Water level fluctuation between normal and high water level shall not exceed eighteen (18) inches for the 2 year design event and shall not exceed five (5) feet for the 100 year design event.

d. If fish are to be supported, at least twenty-five (25) percent of the permanent pool of water shall be a minimum of ten (10) feet in depth.

e. Detention outlet structures shall be located a minimum of six (6) inches above the seasonal high groundwater table to promote infiltration and to improved stormwater residence time.

f. Detention inlet and outlet structures shall be located at opposite ends of the basin to maximize water quality benefits.

g. Maximum height of the face of any Retaining Walls utilized shall not exceed twenty four (24) inches above grade to minimize the visual impact and the need for fencing.

h. For wet detention basins, water entry slopes between one (1) foot above and one (1) foot below shall not exceed ten to one (10:1) to minimize shoreline erosion. Shallow entry angles will improve water quality treatment and increase aquatic habitat.

i. The basin shall be at least one hundred (100) feet away from any water supply wells.

j. The basin shall be at least ten (10) feet away from foundations and associated granular backfill unless measures approved by the City Engineer are taken to prevent leakage to foundation drains.

9. Parking Lots. Parking Lots may be utilized to detain or retain water with the following requirements.

a. Maximum Depth. The maximum allowable depth of standing water at any time in parking Lots shall be six (6) inches at the curb line and one (1) inch in the drive lane.
b. The following landscape and infiltration treatments may be utilized within parking Lots along the edges of the parking area and within parking islands and medians to achieve the stormwater standards.
(1) Infiltration bio-swales.
(2) Vegetated Swales.
(3) Vegetated filter strips.
(4) Infiltration basins or trenches.
(5) Sand filters.
(6) Other similar measures designed to filter, retain, and infiltrate runoff, approved by the City Engineer.
c. Below grade stormwater storage and permeable paving practices are permitted.

10. Redevelopment and development sites shall meet local, State, and NPDES construction erosion and sediment control requirements.

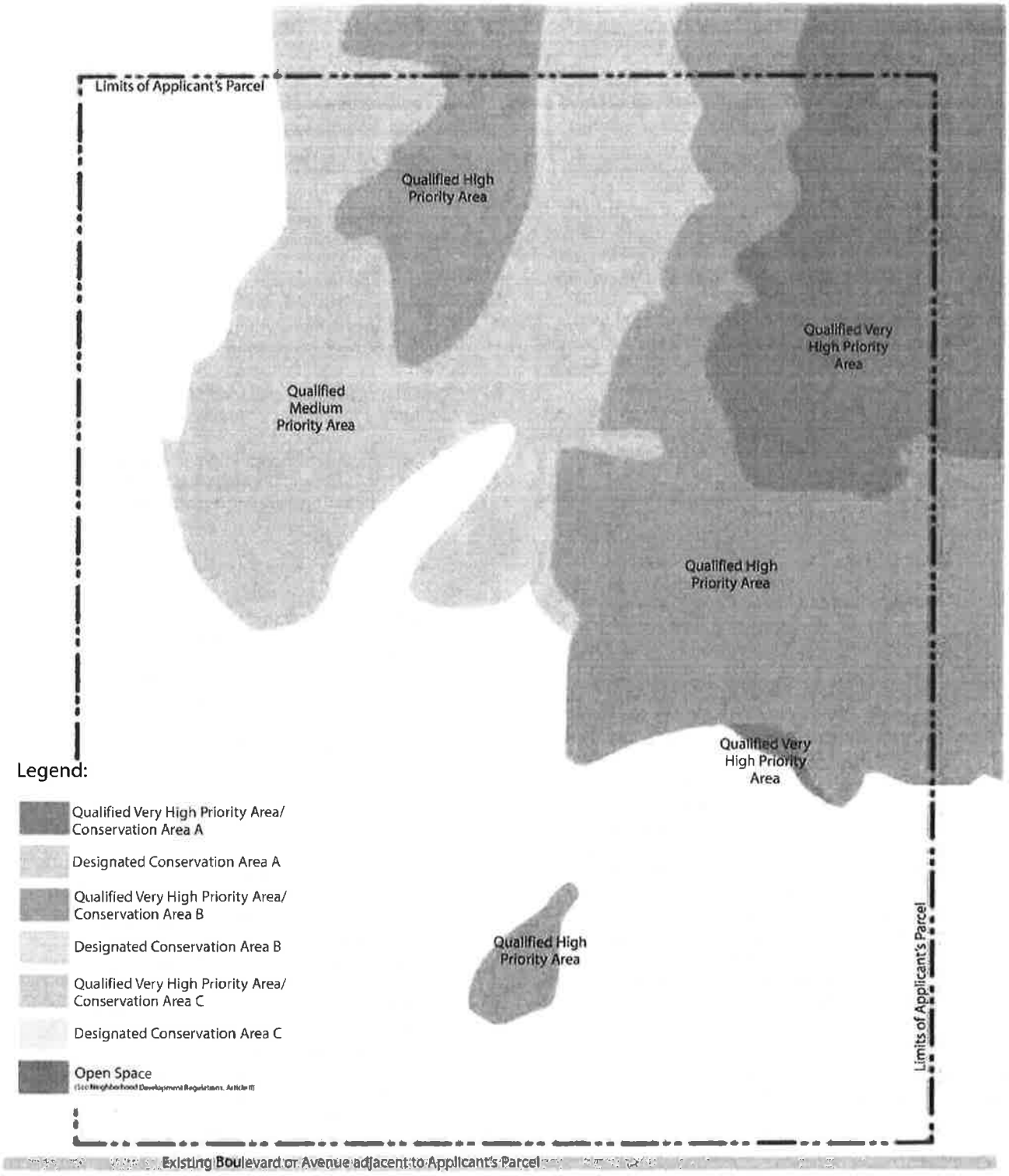


Figure 2.E-1. Priority Areas Delineated on a Parcel.

restoration of any Conservation Area shall be part of a Development Contract.

(2) Management. The process and estimated amounts for funding the Management Plan shall be provided for a five (5) year increment and continuously available to the City should the responsible party fail to implement the Management Plan. The funds shall be set aside in a form acceptable to the City, including but not limited to an escrow account.

(3) Funding Amounts. The funding plan shall include total estimates, unit costs, and quantity estimated for all items on the Action Plan, with an additional fifteen (15) percent contingency.

5. Plan Approval and Revisions. The Restoration and Management Plan shall be submitted and considered for approval with application processes as defined in I.4.

a. Subdivision. The Restoration and Management Plan shall be reviewed by the NRB and considered for approval by the MPC concurrent with the Preliminary Plat (refer to 1.4.C).

b. File. The Restoration and Management Plan shall be kept on file at City Hall.

c. Modifications. Any requested revisions to the Restoration and Management Plan shall be submitted to the City for review and approval.

(1) The Code Administrator shall review any requested revisions and provide written comments and status within sixty (60) days of submittal.

(2) Major revisions involving a change to activities defined in the Action Plan shall be reviewed by the NRB and considered for approval by the MPC.

d. Emergencies. Modifications to the plan, implemented due to an emergency situation, such as fire, flooding, insect infestation, or disease, shall be submitted to the City within thirty (30) days of implementation, to begin the review process discussed in II.11.C(5)(d).

(1) If the Code Administrator disagrees with the need for the emergency modifications, the Applicant shall submit the modification as a major revision for NRB review and approval by the MPC (refer to II.11.C.

D. Plat Requirements.

All Conservation Areas shall be included on the Preliminary (refer to I.4.C) and Final Plat (refer to I.4.E) .

E. General Design Requirements.

The following requirements apply to all Conservation Areas. Refer to Figure 2.E-1 and 2.E-2 for an illustration of these concepts.

1. Intent. General design requirements provide the standards to achieve the following:

a. Establish a high quality, diverse system of natural areas, with a maximum amount of continuity to permit the migration of wildlife and flora.

b. Maintain the natural character of the City and ensure high visibility of the natural areas.

c. Allow pedestrians, bicyclists, and equestrians access to a comprehensive, continuous system of open space and natural areas.

d. Encourage interconnected neighborhoods through required street connections.

2. Continuity. The following standards establish continuity and connectivity between Conservation Areas.

a. Continuity of Conservation Areas on Applicant's Property. Conservation Areas within a quarter (1/4) mile of other Conservation Areas on the Applicant's Property shall be contiguous via a minimum two hundred (200)foot wide area, which shall be maintained as Conservation Area C.

b. Continuity of Conservation Areas on Adjacent Property. Conservation Areas within a quarter (1/4) mile of Conservation Areas located on another Parcel adjacent to the Applicant's Parcel shall be connected via a minimum one hundred (100) foot wide area which shall be maintained as Conservation Area C where Very High and High Priority Areas which meet the requirement do not exist. Applicants shall provide this connection up to their Property Lines.

c. Other Forms of Connections. The following are permitted as connections to meet the requirements of II.11.E(above.

(1) Scenic Corridor Buffer. Scenic Corridor Street Type Buffers (refer to II.8.O) that provide the same connection may fulfill this requirement, with additional width beyond the buffer requirement to meet a total one hundred (100) width.

(2) Stream Buffers. Streamside Management Buffers, (refer to III.12) that provide the same connection may fulfill this requirement.

(3) Street crossings utilizing the Conservation Overlay do not interrupt contiguousness.

d. Exception. Refer to II.1.D for relief from these provisions based on the size of the Applicant's

(5) Diversity. Specific goals for desired plant and/or Animal diversity.
(6) Habitat. Requirements for protection or improvement of any habitat corridors.
(7) Water Quality. Requirements for protection or improvement of water quality.
(8) Forest Health. Requirements towards improvement of forest health.

e. Action Plan. At a minimum, the Action Plan shall include:
(1) Timeline. A timeline for a minimum five (5) year restoration process and delineation of any change in responsible party throughout that time period.
(2) Responsible Party. Each action item shall include the responsible party.
(3) Restoration Practices. Restoration practices shall be defined to meet the goals and objectives and condition of the specific site(s). At a minimum, restoration shall address the following:
(a) Removal of hazardous trees.
(b) Remedy erosion issues.
(c) Removal of invasive and/or aggressive species.
(d) Planting and seeding.
(e) Control for significant insect and disease infestation.
(4) Management Practices. Specific management practices shall be defined to meet the goals and objectives. Actions shall include, at a minimum:
(a) Maintenance practices, including but not limited to, mowing heights and mowing frequencies, trash removal.
(b) Methods for control of invasive species.
(c) Processes for management of problem species including wildlife and plants.
(d) Process for insect and disease control.
(e) Details regarding pesticide use.
(f) Method of replanting and/or seeding, including species, timing, and process.
(g) Method of prescribed burning.
(h) Requirements for erosion control.

f. Monitoring Plan. Description of an annual monitoring process to measure the effectiveness of management techniques and the health of natural communities and natural processes. At a minimum, the monitoring plan shall include:
(1) Specific monitoring methods and protocols.
(2) How the monitoring results shall affect changes in the action plan, if the management practices defined in the action plan do meet the specified objectives.

g. Monitoring Report. The plan shall require submittal of a monitoring report to the City, submitted on a biannual basis. The report shall include:
(1) Discussion of management practices completed during the prior growing season.
(2) Annual monitoring results, including the results from any previous years.
(3) Recommended revisions to the Restoration and Management Plan.

h. Annual Inspection. Annually, a Qualified Professional (see II.11.B), shall visit the site to determine the status of the restoration and recommend any necessary modifications to the Restoration and Management Plan to achieve the goals and objectives.

i. Funding Plan.
(1) Restoration. Funding of the restoration is the sole responsibility of the development. The

Qualified Priority Areas Existing on Site			Required Percentages of Priority Areas to Include In Protection/ Conservation Areas **		
Very High (A)	High (B)	Medium	Protection Area A	Conservation Area B	Conservation Area C
●			100%		
	●			50%	
		●			40%
●	●	●	100%	30%*	0%
●	●		100%	30%*	
●		●	100%		25%*
	●	●		50%	25%*

Note: 0% Conservation Area is required for parcels less than 14 acres, unless contiguity exists, per the design requirements of Areas A & B. See also II.11.B.

Table 2.A-1. Table of Required Conservation Areas as Percentages of Priority Areas.

(j) Plot location.
(k) General Description.
(l) Species Composition and cover class by stratum.
(m)Photographs each class area.

(4) Heritage Species. For each sample plot, determine the percentage cover represented by the City of Lakeland's Heritage Plant List, available at City Hall. Cover is defined as the canopy overhanging the plot boundary.

(5) City Verification. Provide sufficient field delineation (flagging or other markings) of all Very High and High Priority Areas for on-site review by City staff during the administrative review of the Application and prior to any board or commission review meeting.

(a) The City may request additional samplings to validate the size and shape of any designated area.

d. Slope Measurements Documentation. Percentage of slope shall be measured across the Applicant's Property in increments no less than ten (10) percent.

e. Soils Delineation. Delineate the location of Soil Types, identified by the City's Natural Resource Assessment.

f. Open Water Delineation. Delineate the boundaries of all Open Water bodies.

g. Wetlands. As needed, perform a Field Survey of wetland locations per the current US Army Corps of Engineer's wetlands manual.

h. Archaeological Features. A qualified archaeologist shall perform an archaeological survey of the Parcel to determine locations of significant archaeological features, such as Native American sites or cemeteries.

7. Conservation Area Map.

a. Qualify Each Area. The qualification of each area as Very High, High, or Medium Priority is based on the Qualifying Features of each Conservation Area (refer to II.11.F(2), II.11.G(2), and II.11.H(2).

b. All areas that do not meet any qualifications are considered Low Priority and do not constitute a Conservation Area designation.

c. Conservation Area Map. Submit a map of Conservation Areas on the Applicant's Property per the requirements of this Section.

C. Restoration and Management Plan.

1. Restoration and Management Plan Establishment. The Applicant shall establish a five (5) year restoration and a perpetual management plan for all Conservation Areas established by this Section to be kept on file at City Hall.

2. Purpose. The purpose of the plan is to establish the processes and responsible parties to assure the initial restoration and ongoing health and vitality of the Conservation Areas.

3. Plan Implementation. Implementation of the Restoration and Management Plan is the responsibility of the Applicant for a minimum period of five (5) years, unless a transfer of the Applicant's obligations is approved by the BOC.

a. Implementation of the Plan after five (5) years shall be provided in the Covenants and Restrictions for the development (refer to I.7).

4. Restoration and Management Plan Requirements. Refer to the City's "Administrative Guidelines for Restoration and Management Plans", on file at City Hall, for Plan requirements. The plan shall, at a minimum, include the following items:

a. Statement of Purpose. A narrative description of the goals of the restoration and management of the property.

b. Description and location of the Conservation Areas. The following shall be included:
(1) Vicinity map
(2) Legal description of the Conservation Areas.
(3) An aerial photograph of the site or photographs of representative locations, keyed to a site map.
(4) Topographic survey, no less than 5' increments.
(5) Map(s) of landcover types, streams, wetlands, and other water features.
(6) Location and description of any improvements or structures.
(7) Landowner information.

c. Qualifying Features Delineation Survey. The plan shall include the survey(s) developed to determine the Conservation Areas (refer to II.11.B).

d. Management Goals and Objectives. At a minimum, the following shall be included.
(1) A description of the general goals and objectives for establishing, restoring, and maintaining the natural landscape of each Conservation Area, per the requirements of this Section.
(2) Rare Species. Specific objectives for protection of any rare species or species of concern.
(3) Exotic Species. Requirement for removal or retention of exotic species that may occur on the site.
(4) Harvesting. Requirements for harvesting, if any, that may occur on the site.

(4) The area shall not block access to any existing publicly owned Conservation Area, Streamside Management Buffer, or Park.
(5) The area shall not decrease pedestrian or vehicular access throughout the City.

c. The Applicant shall supply a Restoration and Management Plan, and shall pay a fee in lieu of restoration and management to be determined by the City. The fee shall include funding for implementation of the Restoration and Management Plan for ten (10) years.

B. Qualifying Features Delineation.

The following process shall be utilized by the Applicant to determine the location of Priority Areas and Conservation Areas on a Parcel.

1. Conservation Priority Map. The Conservation Priority Map, available at City Hall, determines approximate locations of initial Priority Areas (Very High, High, and Medium Priority) on each Parcel. These locations are defined for Owner information purposes only and shall be verified through a Qualifying Features Delineation (QFD) prior to application for Preliminary Plat (refer to I.4.C).

2. Qualifying Features Delineation (QFD). A survey and assessment is required to delineate areas of qualifying features and determine the accurate boundaries of Priority Areas on the Parcel.

3. Qualified Professional. Unless otherwise noted, the QFD shall be conducted by a forester, arborist, botanist, or other similarly qualified professional approved by the City. Approval includes, at a minimum, certification from a national organization or four (4) year degree in botany, natural resources, or a related field, and a minimum of five (5) years professional experience in the related field.

4. Release Letter. For any portion of the QFD process, the Applicant may submit a letter to the City from the qualified professional stating that no qualifying features exist on the Applicant's Property or a specified portion of the Applicant's Property. City staff will review the determination and make recommendations to the MPC during the Preliminary Plat approval process. The MPC may then release the Applicant from performing that step of the QFD on the applicable portions of the Applicant's Property.

5. Relief. When the Priority Area, verified through the Qualifying Features Delineation, exceeds the initial Priority Areas delineated on the Conservation Priority Map, the Applicant may seek a Subdivision Modification to the requirements of the applicable Conservation Area. Refer to II.11.F, II.11.G, II.11.H, and Table 2.A-1.

6. Qualifying Features Delineation Process. Document and submit the following on a boundary and topographic survey of the Applicant's Property, at a Scale of one (1) inch is no greater than one hundred (100) feet.

a. Forest Stand Groups. Delineate the boundaries of Forest Stand Groups, as defined by the City's Natural Resource Assessment, utilizing the required tree survey (refer to Tree Management Ordinance, Title 13, Chapter 4 of the Municipal Code, B(4)).
b. Initial Priority Area Delineation. Delineate the boundaries of initial Priority Areas (Very High, High, Medium) on the survey of the Applicant's Property utilizing the City's Natural Resource Inventory and Assessment and the Conservation Priority Map as well as review of recent aerial photography, site topography, soil surveys, National Wetland Inventory maps, and Natural Resource Conservation Service farmed wetland maps.
c. On Site Vegetation Survey. Utilizing the initial Priority Area boundaries, perform an on site survey during the growing season (April to November) to qualify the Priority Areas.
(1) Sampling Intensity. One plot per acre is required, preferably on a two chain by five chain grid.
(2) Sample Size. Sample size shall be adjusted base on the following physiognomic classes:
(a) Forest and Woodland. One one hundredth (1/100) acre fixed radius plot (11.78' radius).
(b) Shrubland and Grassland. One (1) square meter quadrat.
(c) Non-vascular and Sparse. If the majority of the area is non-vegetated (sparse) or composed of non-vascular plants, the sample may include a walkthrough or larger plot size documenting the dominant vascular plant composition.
(3) Sampling Methodology. Utilize the sampling form available at City Hall. Within each sample plot, record the following:
(a) Project title.
(b) General project location.
(c) Surveyor(s).
(d) Date(s) of survey.
(e) Slope and aspect.
(f) Elevation in feet.
(g) Plot size and configuration.
(h) Physiognomic class.
(i) Initial Priority Area.

Section 11 - Conservation Area Requirements

A. General Requirements.

1. Intent. The following applies to all requirements of this Section.
   a. TN Code Title 13, Chapters 4 and 7, and Title 6, Chapter 19, enable requirements for adequate open spaces, parks, greenways, public grounds, green spaces, stormwater facilities, landscaping, and planting of shade trees, whether publicly or privately owned.
   b. The Natural Resources Assessment component of the Comprehensive Plan places particular value on open spaces with forest cover, mature native trees, lakes, streams, wetlands, wildlife habitat, rolling terrain, and their environmental, scenic, and community character, as well as the quality of life benefits of the conservation and connection of such open spaces.
   c. The recreation, greenways, and bicycle-pedestrian components of the Comprehensive Plan impact quality of life by providing for anticipated demand for recreation, fostering activity, fostering a family-friendly atmosphere, providing opportunities for relaxation, social interaction, and entertainment, protecting natural areas, connecting facilities to natural areas, and by increasing property values.
   d. The standards outlined in this Section intend to:
      (1) Preserve and protect the City's natural character while allowing development to occur.
      (2) To protect and manage the City's natural areas through the restoration of Natural hydrology and sustainable land management, which shall maximize ecosystem health and biodiversity.
      (3) To protect and enhance the water quality of the City's and surrounding waterways.
      (4) Visibly incorporate these Natural areas into new developments.
      (5) Prioritize Streamside Management Buffers and Very High and High Priority Areas, while still maintaining open space requirements of these Land Development Regulations.
      (6) Provide continuity and connectivity between all conservation areas and open spaces, to allow migration of plants and animals.

2. Applicability. The following standards apply to all all development included within an application for Preliminary Plat (I.4.C), Construction Plans (I.4.D), or Final Plat (I.4.E).
   a. When multiple Parcels are being utilized to create a new Plat, the standards shall be applied to the sum total of the Applicant's Property and not to individual Parcels.

3. Authority. This Section, II.11, is considered part of the Subdivision Regulations and is under the purview of the MPC.
   a. Any modification from these regulations requires a Subdivision Modification approval (I.4.H).
   b. Amendments to the conservation area requirments of this section require an Amendment to Subdivision Regulations (I.4.I).

4. Streamside Buffers. Required Streamside Management Buffers (refer to III.12) are calculated separately and do not count toward any Conservation Area requirement.

5. Conservation Types. The following three (3) levels of conservation are defined, each with specific requirements, in this Section and referred to as "Conservation Types" or "Conservation Areas."
   a. Conservation Area A.
   b. Conservation Area B.
   c. Conservation Area C.

6. Required Amount of Conserved Area. For each Priority Area, percentages required to be set aside for Conservation Areas are defined within the Specific Requirements for each Priority Area and Conservation Area Type (See Table 2.A-1), with the following exception:
   a. Refer to II.1.D for exceptions to Properties with more than fifty (50) percent of the Applicant's Property required to be Conservation Area and/or Open Space.

7. Dedication of Conservation Areas to the City. The Applicant may Dedicate any or all of their Conservation Area to the City with the following requirements.
   a. During the Preliminary Plat process (refer to I.4), the Applicant shall identify the properties for Dedication.
   b. During the Final Plat process (refer to I.4.E), the Dedication shall be reviewed and considered for recommendation by the NRB and MPC, shall be considered for approval, approval or other applicable action by the BOC, and shall meet the following:
      (1) The total area shall be a minimum of twenty (20) acres and shall be contiguous, with the exception of permitted street crossings.
      (2) The area shall include any Conservation Area A on the Parcel.
      (3) Areas smaller than twenty (20) acres will be considered for Dedication, if the area is contiguous with and increases the size of another publicly owned Conservation Area, Streamside Management Buffer, or Park.

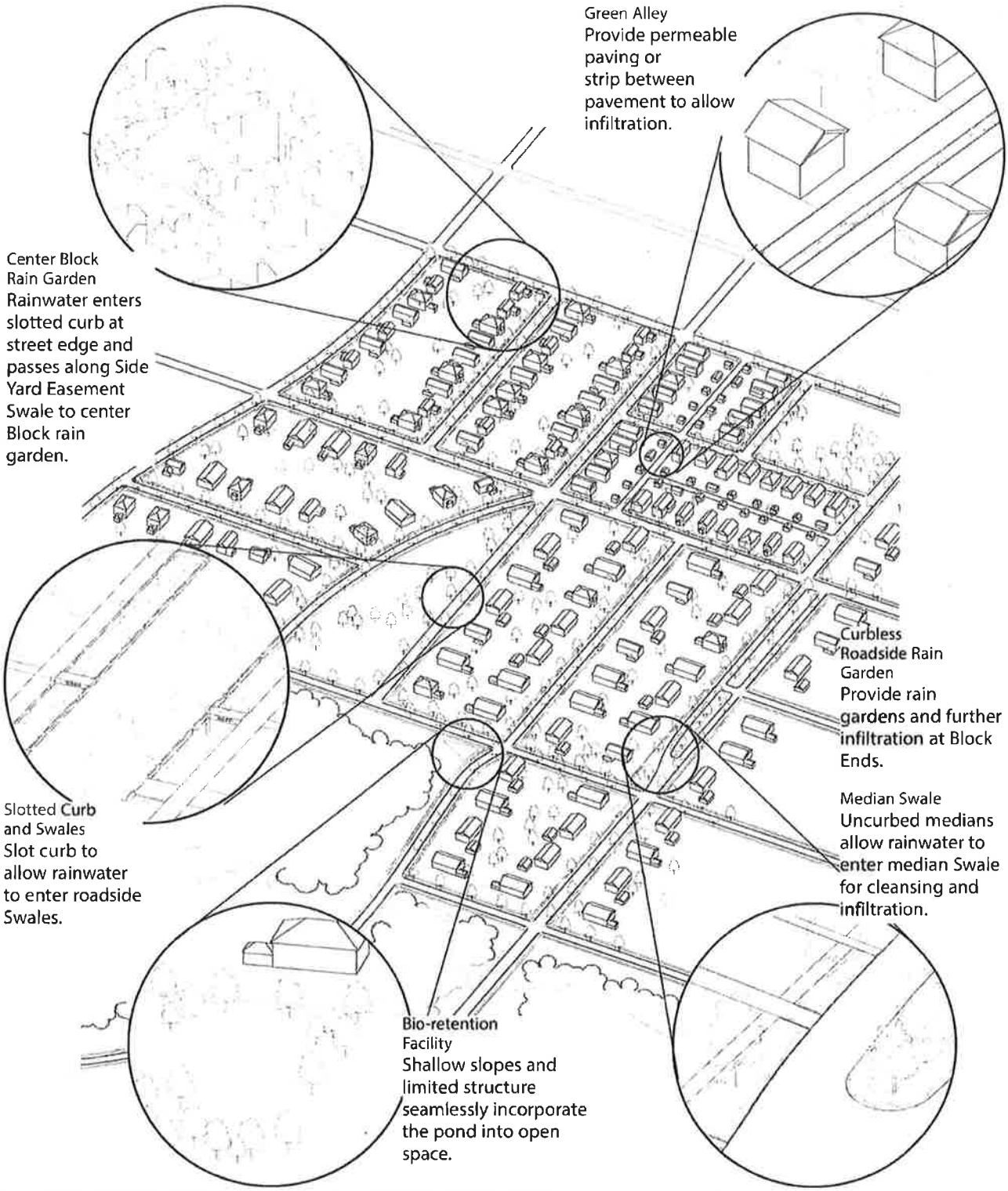


Figure 1.E-5. Neighborhood Example incorporating a Variety of Infiltration and Retention Methods.

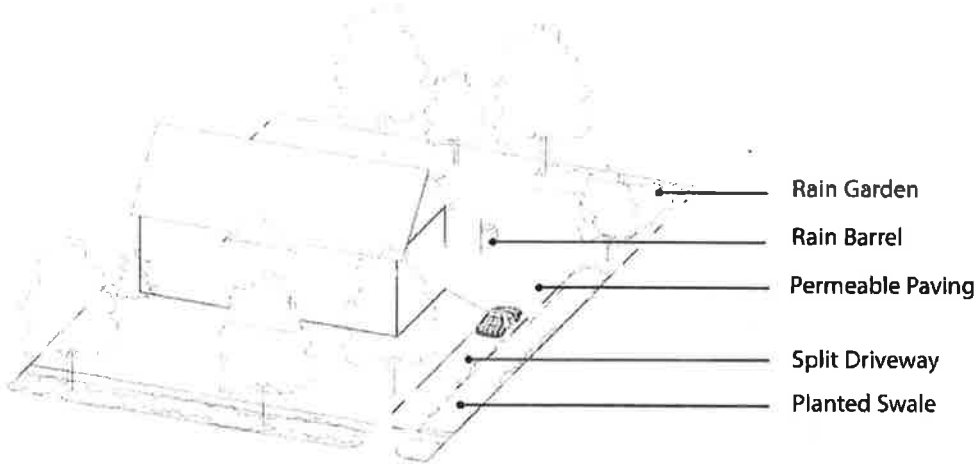


Figure 1.E-3. Residential Site Example Incorporating Infiltration and Retention Methods.

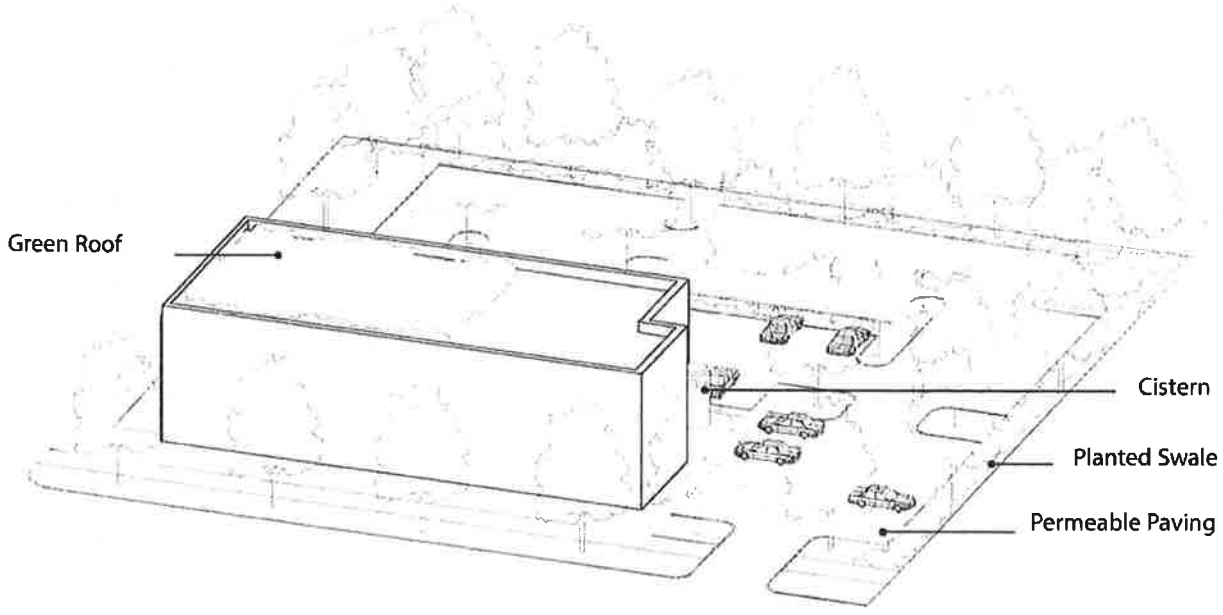


Figure 1.E-4. Commercial Site Example incorporating Infiltration and Retention Methods.

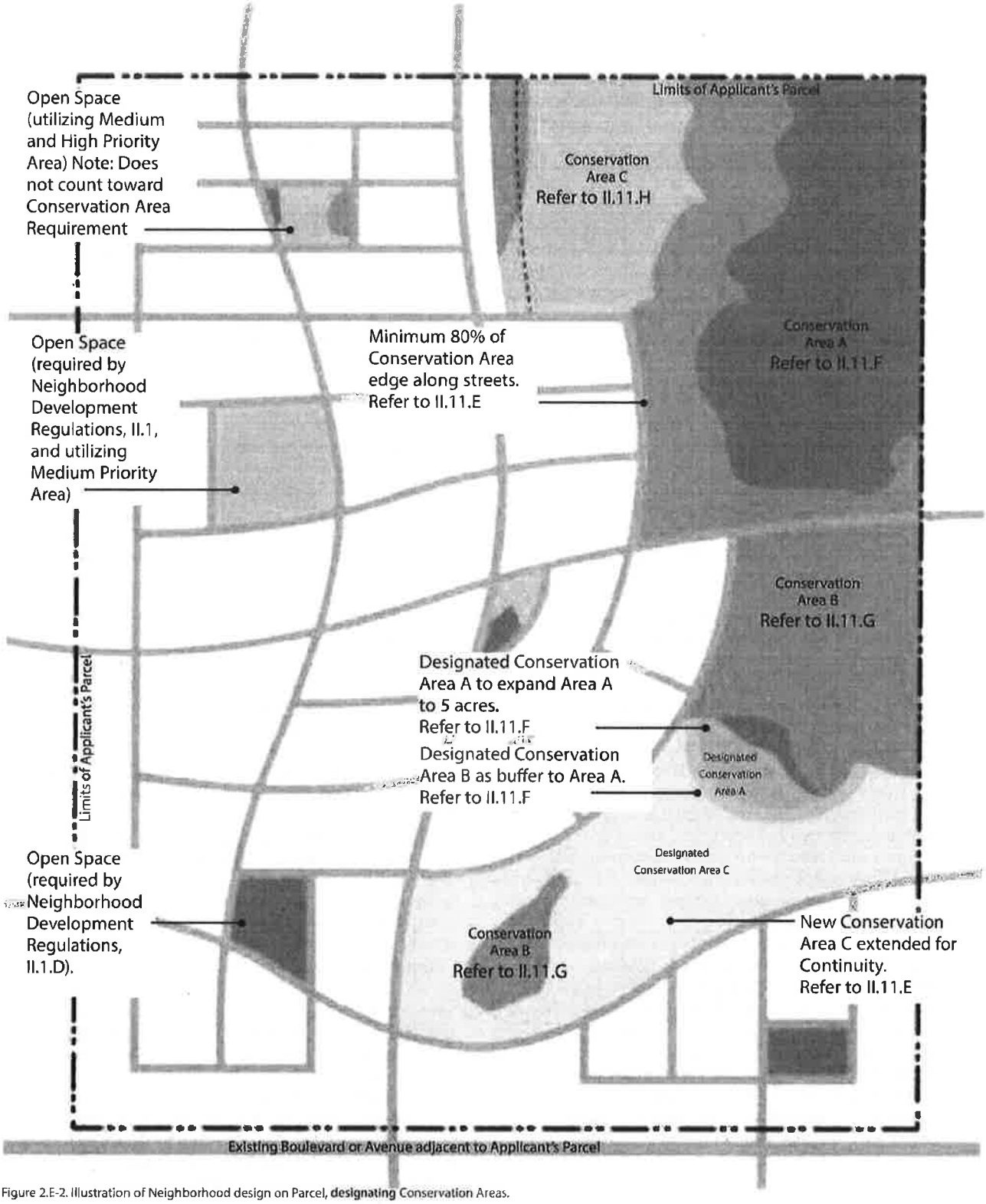


Figure 2.E-2. Illustration of Neighborhood design on Parcel, designating Conservation Areas.

Property and the amount of Conservation Area and open space required.

3. Pedestrian, Bicycle, and Equestrian Access. Refer to the City's Comprehensive Plan, available at City Hall, for the recommended locations of pedestrian/bicycle, and equestrian trails.
   a. Trails for the purpose of continuity may be permitted through Conservation Area A with the approval of the MPC.
   b. Additional trails beyond what is recommended in the Comprehensive Plan may be provided through Conservation Types B and C with the approval of the MPC only.

4. Street Connections. The following standards establish street connections through the Conservation Areas.
   a. Existing Streets. Street connections through Conservation Areas shall connect to existing streets, unless otherwise permitted in these regulations.
   b. Conservation Areas B and C. Street connections through Conservation Areas B and C shall occur a minimum of once every half (1/2) mile with the following exceptions:
      (1) At the Parcel boundaries, when the adjacent Parcel is within another municipality and no connection exists.
      (2) At City Waterways unless a street crossing is shown on the Applicant's Property on the City's Comprehensive Plan.
      (3) At locations with slopes steeper than fifteen (15 percent over one (1) continuous acre.
      (4) At Highways or railroads with limited access and no opportunity to connect to the other side.
      (5) On small Parcels where the context of the site would not reasonably accommodate a street connection as determined by the MPC
   c. Conservation Area A. Streets shall not cross Conservation Area A with the following exception.
      (1)When Area A is greater than fourteen (14) acres, the minimum number of streets may cross Area A to meet II.11.E(.
   d. In locations where the Conservation Area blocks the minimum number of Access Points for a Neighborhood Type (refer to II.1.E) and no other location is available, the MPC may approve a reduction in the interval of street crossings to meet the Neighborhood Type requirement.
   e. Right-of-Way Dedication. All street connections through Conservation Areas per these requirements will be dedicated Rights-of-Way, and will not be zoned OS5, nor considered Conservation Area.
   f. Types. Any Street Type, with the exception of a Boulevard, may cross a Conservation Area; however, the Conservation Street Overlay shall be utilized (refer to II.8.P).

5. Street Frontage. The following standards require Conservation Areas to front on streets.
   a. A minimum eighty (80) percent of the linear edge of all combined conservation areas shall abut street Right-of-Way with the following exceptions.
      (1) Those edges of all combined conservation areas that abut other open space.
      (2) Those edges that abut other developments under separate ownership.

6. Fencing. Conservation Areas may be fenced, provided that the following requirements are met.
   a. Height. Fencing shall be a maximum height of forty-two (42) inches.
   b. Level of Opacity. Fence opacity shall be no greater than sixty (60) percent.
   c. Gates or Openings. Gates or openings shall be provided on every Street Face at a minimum of every two hundred (200) feet.

7. Open Water. A twenty (20) foot buffer of Conservation Area shall be provided adjacent to all Open Water bodies.

F. Specific Requirements for Very High Priority Areas and Conservation Area A.

1. Intent. Very High Priority Areas shall be established as Conservation Area A to preserve and restore the City's prime Natural areas, including valuable forest stands, wetlands, Open Water bodies, and steep slopes.

2. Qualifying Features. Very High Priority Areas are areas greater than two (2) acres that meet any one of the following criteria:
   a. Greater than forty (40) percent Lakeland Heritage Plants, as determined by the vegetation survey, refer to II.11.B.
   b. All wetlands.
   c. All Open Water bodies.
   d. Archaeologically historic sites, as determined by the required archaeological survey, refer to II.11.B(.

3. Amount of Area to be Conserved. One hundred (100) percent of the Very High Priority shall be preserved in its entirety (see Table 2.A-1) with the following exceptions:
   a. Refer to II.1.D for the maximum total amounts of open space and permitted reductions in types of open space.
   b. Refer to II.11.B for relief based on unexpected quantities of Conservation Area.

4. Specific Design Requirements. The following specific design standards are required for all Conservation Area A locations.
   a. Minimum Size of Conservation Area. Conservation Area A shall consist of at least five (5) acres of contiguous area.
      (1) If the qualifying area consists of less than five (5) contiguous acres, the area shall be expanded to fulfill this requirement.
      (2) Exception: For Subdivisions fourteen (14) acres or smaller where qualifying areas exist, Conservation Area A may be eliminated from open space requirements, unless it is contiguous to an existing or approved Conservation Area A, an existing, approved, or required Stream Management Buffer, a Scenic Corridor Buffer or Easement, or a public park, wherein the total of the combined areas reaches five (5) acres or more. In no instance shall more than fifty (50) percent of the Subdivision, including all Conservation Areas and Open Spaces (Total Open Space), be required. Due to the small size of the site, MPC may allow reduced continuity, street frontage, street connection, minimum width, and buffer requirements for the conservation area.
   b. Minimum Width of Conservation Area. The minimum width of the area in any location shall be at least one hundred (100) feet.
   c. Required Buffers. Fifty (50) foot buffers shall be established between the area and any adjacent Zoning District other than Open Space Districts.
      (1) Buffer Designation. These buffers shall meet all the requirements of Conservation Area B areas, and will count towards the requirement quotas of that Area (see II.11.G).
   d. Street Connections and Crossings. There shall be no street connections or crossings through Conservation Area A, except as permitted in II.11.E.
   e. Impervious Coverage. No increase in impervious surfaces is permitted.
   f. Uses and Structures. No Use other than Conservation (refer to III.2.J) is permitted.
      (1) No structures are permitted in Conservation Area A.
      (2) Sports fields and playgrounds are not permitted.

5. Restoration and Management Requirement. Restoration and Management of Conservation Area A shall be defined in the Restoration and Management Plan (refer to II.11.C) with the following minimum requirements.
   a. Avoid or minimize soil damage, compaction, or other impacts to soil health.
   b. Establish a stable vegetative condition for the entirety of the Parcel. Remove invasive or noxious trees, shrubs, and herbaceous plants.
   c. In wooded areas, thin all trees to allow a light level on the ground plane that can sustain suitable grasses and flowering perennials, approximately thirty (30) to eighty (80) shade trees per acre.
   d. Seed or plant bare (prepared) soil with suitable prairie, woodland, or meadow grasses.
      (1) Provide adequate water, weed control, and other measures to allow healthy establishment of the vegetation.
      (2) For warm season grasses, maintain with annual controlled prescription burning, or seasonal mowing, when burning is not feasible.
      (3) For cool season grasses or meadows, maintain with seasonal mowing.
   e. Improve and enhance biodiversity.
   f. Restoration is required for one hundred (100) percent of the area of Conservation Area A.

6. Dedication. Conservation Area A may be dedicated in whole to the City or another organization approved by the City for restoration and/or management of the land, refer to II.11.A, pursuant to a Restoration and Management Plan approved by the City, and the fulfillment of all conditions required for the acceptance of said land.

G. Specific Requirements for High Priority Areas and Conservation Area B.

1. Intent. Conservation Area B is established to set aside appropriate portions of High Priority Areas, to maintain natural area through management, and to foster continuity between the natural areas.

2. Qualifying Features. High Priority Areas include areas greater than two (2) acres with twenty (20) to thirty-nine (39) percent Lakeland Heritage Plants, as determined by the vegetation survey, refer to II.11.B.

3. Amount of Area to be Conserved. Reference Table 2.A-1 for percentages of High Priority Areas to be designated as Conservation Area B with the following exceptions.
   a. Refer to II.1.D for information on maximum total amounts of open space and permitted reductions in types of open space.

b. Refer to II.11.B for relief based on unexpected quantities of Conservation Area.

4. Specific Design Requirements. The following specific design standards are required for all Conservation Area B locations.
   a. Minimum Size of Conservation Area. Conservation Area B shall consist of at least two (2) acres of contiguous area.
      1. If the qualifying area consists of less than two (2) contiguous acres, the area shall be expanded to fulfill this requirement and all shall serve as Conservation Area B.
      2. Exception: For Subdivisions fourteen (14) acres or smaller where qualifying areas exist, Conservation Area B may be eliminated from open space requirements, unless it is contiguous to an existing or approved Conservation Area A or B, an existing, approved, or required Stream Management Buffer, a Scenic Corridor Buffer or Easement, or a public park, wherein the total of the combined areas reaches five (5) acres or more. In no instance shall more than fifty (50) percent of the Subdivision, including all Conservation Areas and Open Space (Total Open Space), be required. Due to the small size of the site, MPC may allow reduced continuity, street frontage, street connection, minimum width, and buffer requirements for the conservation area.

   b. Contiguous. Streets crossing the Conservation Area developed with the Conservation Street Overlay do not interrupt the contiguousness of the area, but the street Right-of-Way shall not be included in the area quantity.
   c. Minimum Width of Conservation Area. The minimum width of the area in any location shall be at least fifty (50) feet.
   d. Relationship with Other Conservation Areas. The conservation area(s) shall comply with the continuity provisions of this section with other Conservation Area A, Conservation Area B, and Conservation Area C areas, both on the Parcel and adjacent Parcels. Refer to II.11.E).
   e. Impervious Coverage. A maximum of five (5) percent of the Applicant's Property's Conservation Area B may be covered in Impervious surfaces, to accommodate permitted structures and parking. An additional area of five (5) percent may be Semi-Pervious.
   f. Uses and Structures. All Uses, Accessory Uses, and Accessory Structures permitted in the OS5 district are permitted in Conservation Area B. Refer to III.2 Uses.
      (1) Sports fields and playgrounds are not permitted.
      (2) A Library/Museum (refer to III.2.D is permitted with the following development standards.
         (a) The Conservation Area B Lot shall be a minimum of five (5) acres.
         (b) The library/museum collection and/or programming shall be focused on the natural environment.
         (c) The Civic Building Type (refer to III.3.M) shall be used for the Library/Museum.
      (3) Accessory Structures are permitted only on Lots five (5) acres or larger.

5. Management Requirement. Management of Conservation Area B shall be defined in the Restoration and Management Plan with the following minimum requirements.
   a. Soil Health. Avoid or minimize soil damage, compaction, or other impacts to soil health.
   b. Establish a stable vegetative condition for the entirety of the Parcel. Remove Invasive or noxious trees, shrubs, and herbaceous plants.
   c. In wooded areas, thin all trees to allow a light level on the ground plane that can sustain suitable grasses and flowering perennials, approximately thirty (30) to eighty (80) shade trees per acre.
   d. Seed or plant bare (prepared) soil with suitable prairie, woodland, or meadow grasses.
      (1) Provide adequate water, weed control, and other measures to allow healthy establishment of the vegetation.
      (2) For warm season grasses, maintain with annual controlled prescription burning, or seasonal mowing, when burning is not feasible..
      (3) For cool season grasses or meadows, maintain with seasonal mowing.
   e. Improve and enhance biodiversity.

H. Specific Requirements for Medium Priority Areas and Conservation Area C.

1. Intent. Conservation Area C is established to set aside appropriate portions of Medium Priority Areas, to maintain Natural areas through management, to foster continuity between the Natural areas, and to preserve the existing character of the City.

2. Qualifying Features. Medium Priority Areas include all areas greater than one (1) acre, not included in Very High or High Priority, with ten (10) to nineteen (19) percent Lakeland Heritage Plants, as determined by the vegetation survey, refer to II.11.B.

3. Amount of Area to be Conserved. Reference Table 2.A-1 for percentages of Medium Priority Areas to be

designated as Conservation Area C with the following exceptions.

a. Refer to II.1.D for information on maximum total amounts of open space and permitted reductions in types of open space.
b. Refer to II.11.B for relief based on unexpected quantities of Conservation Area.

4. Specific Design Requirements. The following specific design standards are required for all Conservation Area C locations.
   a. Minimum Size of Conservation Area. There is no minimum area required. The size of this area is determined by other open spaces on the site, and Total Open Space, if medium priority qualifying features exist. In no instance shall more than fifty (50) percent of the Subdivision, including all Conservation Areas and Open Space (Total Open Space), be required.

      (1) Exception: For parcels less than fourteen (14) acres, no medium priority conservation area is required. Due to the small size of the site, MPC may allow reduced continuity, street frontage, street connection, minimum width, and buffer requirements for the conservation area, if it is utilized.
   b. Minimum Width of Conservation Area. The minimum width of the area in any location is thirty (30) feet.
   c. Relationship with Other Conservation Areas. The conservation area(s) shall comply with the continuity provisions of this section with other Conservation Area A, Conservation Area B, and Conservation Area C areas, both on the Parcel and adjacent Parcels.
   d. Impervious Coverage. A maximum of five (5) percent of the Property's Conservation Area C may be covered in Impervious surfaces. An additional area of five (5) percent may be Semi-Pervious.
   e. Uses and Structures. All Uses, Accessory Uses, and Accessory Structures permitted in the OS5 district are permitted in Conservation Area C. Refer to III.2.
      (1) Sports fields and playgrounds are not permitted.
      (2) A Library/Museum (refer to III.2.D.4) is permitted with following development standards.
         (a) The Conservation Area C Lot shall be a minimum of five (5) acres.
         (b) The library/museum collection and/or programming shall be focused on the natural environment.
         (c) The Civic Building Type (refer to III.3.M) shall be used for the Library/Museum.
      (3) Accessory Structures are permitted only on Lots five (5) acres or larger.

5. Management Requirement. Management of Conservation Area C shall be defined in the Restoration and Management Plan (refer to II.11.C) with the following minimum requirements.
   a. Avoid or minimize soil damage, compaction, or other impacts to soil health.
   b. Establish a stable vegetative condition for the entirety of the Parcel. Remove invasive or noxious trees, shrubs, and herbaceous plants.
   c. In wooded areas, thin all trees to allow a light level on the ground plane that can sustain suitable grasses and flowering perennials, approximately thirty (30) to eighty (80) shade trees per acre.
   d. Seed or plant bare (prepared) soil with suitable prairie, woodland, or meadow grasses.
      (1) Provide adequate water, weed control, and other measures to allow healthy establishment of the vegetation.
      (2) For warm season grasses, maintain with annual controlled prescription burning, or seasonal mowing, when burning is not feasible..
      (3) For cool season grasses or meadows, maintain with seasonal mowing.
   e. Improve and enhance biodiversity.

II. Neighborhood Development Regulations
Section 12 - Site Disturbance and Grading

A. General Requirements.

1. Intent. The following provisions are established to accomplish the following:
   a. Preserve existing topography, drainage patterns, perviousness, and soil characteristics.
   b. Design sites to fit and follow the topography and soil so as to create the least potential for tree and natural vegetation loss.

2. Applicability. The following standards apply to all development included within an application for Preliminary Plat (I.4.C), Construction Plans (I.4.D), or Final Plat (I.4.E).

3. Authority. This Section, II.12, is considered part of the Subdivision Regulations and is under the purview of the MPC.
   a. Any modification from these regulations requires a Subdivision Modification approval (I.4.H).
   b. Amendments to this Section, II.12, require an Amendment to Subdivision Regulations (I.4.I).

4. Submittal. A Protection Zone Plan is required per I.4. Scale shall be one inch is no greater than one hundred feet, including the following:
   a. Protection Zones with dimensions of site disturbance areas per II.12.B.
   b. Fencing required for Protection Zones.

B. Site Disturbance and Grading.

1. Site Disturbance. Limit site disturbance and any construction activities to the following maximum dimensions:
   a. Forty (40) feet beyond all building perimeters.
   b. Ten (10) feet beyond all surface walkways, patios, surface parking, pools, and utilities less than twelve (12) inches in diameter;
   c. Fifteen (15) feet beyond Accessory Structures, street curbs, and utilities larger than twelve (12) inches.
   d. Twenty five (25) feet beyond constructed areas with permeable surfaces (permeable paving areas, stormwater detention facilities, playing fields) that require additional staging areas in order to limit compaction in the construction areas.
   e. To the extent that these areas occupy the entirety of the Lot, the Code Administrator (for I.4.D Construction Plans) or the Municipal Planning Commission (MPC) (for I.4.C Preliminary Plat), depending on the applicable process, may exempt the Applicant from establishing Protection Zones.

2. Conservation Areas. Conservation Areas as designated shall not be disturbed. See II.11.

3. Tree Protection. Tree protection areas shall be delineated separately outside the disturbance areas. Refer to Tree Management Ordinance, Title 13, Chapter 4 of the Municipal Code.

4. Limit Areas of Disturbance. Confine construction, staging, and disturbance zones to only those necessary for the current stage of work, and to areas previously disturbed.

5. Install Erosion and Sedimentation Controls. Site clearing operations shall not commence until temporary erosion- and sedimentation-control and plant-protection measures are in place.

C. Grading and Slope Preservation.

1. Maximum Cut and Fill. The following maximums apply to all sites.
   a. Cuts shall not exceed four (4) feet of depth except for construction of a building foundation, basement or swimming pool excavation.
   b. Fill shall not exceed four (4) feet of depth.
   c. A combination of cut and fill in any location shall not exceed eight (8) feet.
   d. All cuts and fill shall be restored and stabilized.

2. Steep slopes. Slopes greater then fifteen (15) percent shall be protected and incorporated as follows:
   a. Areas with slopes greater than fifteen (15) percent across one (1) or more contiguous acres shall incorporate the area into Open Space (refer to III.4), Conservation Area (refer to II.11), Streamside Management Buffer (refer to III.12), or general site Landscape Areas (refer to III.5.)

3. Modification. For approval of cut and/or fill exceeding four (4) feet of depth, all of the following shall apply:
   a. No other site layout is feasible resulting in the same amount of gross building square footage; and
   b. The cut and/or fill shall not be located within Conservation Area Type A or within Streamside Management Buffers, and shall not detrimentally impact nearby Stream Management Buffers, or Conservation Open Spaces; and
   c. Fifty (50) percent or more of the site is unavailable for development if the maximums defined in II.12.C are adhered to.
   d. The resulting total amount of cut and fill is no more than is necessary to accomplish the proposed site layout

D. Existing Vegetation and Soil Protection.

1. Intent. Protect existing soils and vegetation from disturbance during construction processes.
   a. To preserve existing Tree Canopy and natural or existing vegetation, until such time as an area is to be disturbed for development; and
   b. To help hold soils in place, to enhance absorption, retention, and infiltration of precipitation and minimize runoff; and
   c. To maintain infiltration and subsurface drainage of existing soils.

2. Protection Zone Plan. Develop a site vegetation and soil Protection Zone Plan, and designate areas outside the limits of disturbance as Protection Zones, including the following areas:
   a. All areas to be landscaped.
   b. All areas required for stormwater management-per Stormwater Management Plan. Refer to II.10.
   c. All areas of existing trees and landscape to be retained.
   d. All areas outside the limits of site disturbance. See II.12.B.

3. Fencing. Install fencing, per standard City detail available at City Hall, along edges of Protection Zones before materials or equipment are brought on the site and construction operations begin.

4. Prohibited Practices. The following practices are prohibited within Protection Zones during construction:
   a. Storage of construction materials, debris, waste, or excavated material.
   b. Parking vehicles or equipment.
   c. Foot traffic.
   d. Erection of sheds or structures.
   e. Impoundment of water.
   f. Excavation or other digging unless otherwise indicated.
   g. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
   h. Disposal of any waste material or substance.

5. Construction Zone Soils. In unprotected locations receiving construction activities:
   a. Maintain the infiltration and subsurface drainage capacity of existing soils by avoiding rutting and compaction.
   b. Regularly apply thick layers of mulch to minimize soil compaction in areas of high traffic.
   c. Avoid working on wet soils with heavy equipment.

E. Retaining Walls.

1. Intent. The purpose of this chapter is to provide minimum standards to safeguard life, health, property and public welfare by governing the construction and placement of Retaining Wall systems through the adoption of specific standards to augment existing codes.

2. Applicability. These provisions shall apply to the construction and/or alteration of Retaining Walls on all public and private property that is not within a public Right-of-Way of the city.

3. Exemptions. Retaining walls with a height of wall not exceeding four feet are exempt from this standards if:
   a. The wall is set back from any adjacent property lines or structures at a minimum distance equal to the height of the wall;
   b. The material retained by the wall slopes up and away from the wall at a ratio not exceeding one foot vertical per three feet horizontal distance; and
   c. The wall is not supporting a surcharge.

4. Definitions. For the purposes of this chapter, the following definitions shall apply:
   a. "Height of wall" means the measured distance between the bottom of the footing to the top of a wall.
   b. "Structural repairs" means to replace, restore, or remove any part of a Retaining Wall which affects its ability to resist the lateral or vertical forces of the adjacent soils.

5. Permit requirement. It shall be unlawful to construct, enlarge, or make structural repairs to any Retaining Wall without acquiring Construction Plan approval if associated with a Plat, Site Plan Review if associated with other development, or Minor Site Plan if unassociated with other development. Cosmetic repairs that do not affect the ability of the wall to resist lateral and vertical soil forces shall not require a permit.

6. Emergency Repairs. Emergency repairs required to stabilize slopes may exceed the height limits set forth in this Chapter provided the City Engineer determines the following criteria are met:
   a. An imminent danger of slope failure exists that will threaten life or the safety of existing up slope or down slope property; and
   b. The Code Enforcement Official certifies that strict compliance with the other provisions of this Chapter is likely to result in insufficient time to

complete the repairs to provide for the necessary stabilization of the active area.

c. The emergency repairs are not necessitated by actions of the Applicant or property Owner in violation of City codes.

d. The height of the Retaining Walls is the minimum necessary to stabilize the slope.

7. Design and Construction. Retaining wall systems that are newly constructed, structurally repaired or enlarged shall be designed or reviewed by a professional engineer licensed to practice in the state of Tennessee for all loads as specified in the Building Code and within this Chapter and in keeping with nationally recognized standards. Designs shall be based upon sound engineering and geotechnical principles.

   a. Utility Easements. Retaining Walls shall not restrict access to utilities.

   b. Drainage Easements. Retaining Walls shall not impede the normal flow of storm water and shall not cross an open drainage channel.

   c. Retaining walls shall not be constructed over a public or private access easement.

   d. Retaining walls constructed near street intersections shall provide a reasonable degree of traffic visibility.

8. Maximum Wall Heights.

   a. The maximum height of a retaining wall in a fill section shall be limited to ten (10) feet.

   b. The maximum height of a retaining wall in a cut section shall be limited to twelve (12) feet. A section that consists of a combination of a cut and a fill shall be considered as a cut; provided that the fill above the cut is no more than two (2) feet in depth.

   c. Where multiple walls are situated in a terrace-like pattern, they shall be considered one wall for purposes of determining the height of wall if the horizontal separation between adjacent walls is less than or equal to the combined height of the walls.

Section 13 - Soil Erosion and Sediment Control During Construction

A. General Requirements.

1. Intent. To regulate erosion and sediment control on land disturbance or construction sites and to promote clean water in all waters of the state, storm sewers, and drainage structures.

2. Applicability. Any land disturbance activity, except as exempted by Subdivision or Zoning Regulations, included within an application for Preliminary Plat (I.4.C), Construction Plans (I.4.D), or Final Plat (I.4.E), requires development of a Soil Erosion and Sediment Control Plan per II.13.B, below.

3. Authority. This Section, II.13, is considered part of the Subdivision Regulations and is under the purview of the MPC.
   a. Any modification from these regulations requires a Subdivision Modification approval (I.4.H).
   b. Amendments to this Section, II.13, require an Amendment to Subdivision Regulations (I.4.I).

4. Pre-Construction Design. All development shall be planned and designed to minimize soil erosion and sedimentation of drainageways using the following principals.
   a. Plan the development to fit the existing topography, soils, drainage patterns, and natural vegetation of the site.
   b. Minimize the amount of cut and fill.
   c. Retain and protect natural vegetation and soil structure.

B. Soil Erosion and Sediment Control Plan.

A Soil Erosion and Sediment Control (SESC) Plan is required in accordance with the General Criteria established in the Tennessee Department of Environment and Conservation Erosion Sediment Control Handbook, A Guide for Protection of State Waters through the use of Best Management Practices during Land Disturbing Activities, distributed by Tennessee Department of Environment and Conservation, Second Edition March 2002 and any future amendments to same, is hereby adopted. The handbook shall be used to develop the SESC Plan and as guidance in methods and materials in the installation and construction of erosion control measures as shown on the approved plan.

1. The SESC Plan shall be designed and worded to address all potential field conditions to ensure compliance with the intent of these regulations.

2. The SESC Plan shall be stamped and sealed by a professional engineer.

3. The SESC Plan, at minimum, shall include the following:
   a. A list and brief description of each control measure that will be used.
   b. A scaled site map clearly showing the existing and proposed contour lines, drainage ways, north arrow and location and type of each erosion and sediment control measure.
   c. An implementation sequence indicating the order in which the erosion and sediment control activities will take place.
   d. An inspection and maintenance schedule for all disturbed areas, material storage areas and erosion and sediment controls that were identified in the plan. This schedule shall identify, at a minimum, all erosion and sediment control measures to be inspected every seven (7) calendar days and within 24 hours of any storm event exceeding 1/2-inch precipitation.
   e. Designated areas for equipment maintenance and repair.
   f. Provisions for waste receptacles at convenient locations, the regular collection of waste, protected storage areas for chemicals, paints, solvents, fertilizers and other potentially toxic materials and adequately maintained sanitary facilities.

4. Approval. Depending on the type of development, the SESC Plan shall be submitted with the Construction Plans process.
   a. The City Engineer's signature of approval is required on all SESC Plans.
   b. Approval of the Construction Plans shall constitute approval of the SESC Plan.

5. Other Permits. All other required permits must be obtained from other federal, state, and local governments. Copies of approvals from other agencies shall be provided to the City to assure compliance.

C. Soil Erosion and Sediment Control Techniques.

1. Phasing and Disturbance.
   a. Minimize the extent of the area exposed at one time and the duration of the exposure.
   b. Stabilize disturbed areas immediately after soil exposure or disturbance or after finish grade has been attained.
   c. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross Protection Zones unless no other path exists, refer to II.12. Crossing Protection Zones shall be minimized and consolidated.

d. No soil storage piles shall be located with a downslope drainage length of less than thirty-five (35) feet from wetlands, channels, detention basins or drainage Swales.
   (1) Cover or vegetate (with an appropriate grass matrix) soil stock piles that remain on site longer than two weeks.
   (2) Filter fence or equivalent shall be installed at a minimum distance of ten (10) feet from stockpile edge to reduce water build-up behind fence and potential failure of sediment control structure.
   (3) Do not store soil stockpiles within Critical Root Zone of remaining trees or within protection areas.
e. SESC shall remain in place and in functioning condition for the duration of construction activity and until the areas that they protect are completely stabilized.
f. At the completion of the project, stormwater management facilities shall be inspected by the City to determine any cleaning or flushing of trapped sediment which may be required due to erosion. The responsibility for any needed cleaning or flushing lies with the site developer.

2. Erosion Control Practices:
   a. Apply perimeter control practices such as silt fences or earthen dikes to protect the disturbed area from offsite runoff and to filter concentrated runoff from the site to prevent sedimentation damage to areas below/downslope of the development site.
   b. Remove sediment from storm water before it leaves the site by allowing runoff to pond in controlled areas (traps or basins) or by using vegetative cover, silt fences or hay bales.
   c. Keep runoff velocities low and retain runoff on the site.
   d. Direct upslope water to other rainwater facilities to avoid disturbed areas.
   e. Transport surplus surface runoff down steep slopes through lined channels or piping. Ensure appropriate conditions at the bottom of the slope to avoid any impact from piped or channeled water and diffuse the energy and volume of the storm flow.
   f. Straw bales or silt fence filters are required around inlet structures, catch basins, manholes, and other stormwater management facilities and structures.
   g. Construction entrances shall be limited to two per site and shall be kept clean during the process.
   h. Washing or cleaning of equipment shall be relegated to a designated area with appropriate controls.
   i. Examples of acceptable temporary structural SESC controls include diversion, silt fences, straw bale barriers, storm drain inlet protection, outlet protection, sediment traps, sediment basins, slope drains, subsurface drains, riprap, check dams, level spreaders, paved flumes, construction road stabilization and temporary gravel construction entrances and exits.
   j. Examples of acceptable vegetative SESC include vegetative buffer zones, protection of trees, temporary seeding, permanent seeding, mulching, topsoiling, erosion & sediment control blankets and surface roughening. Sod is not an acceptable vegetative SESC control.
   k. If it is necessary to remove topsoil, remove sod and grass before stripping and reuse topsoil on site.
      (1) Grade and shape topsoil stockpiles to drain surface water and cover stockpiles to prevent erosion by wind or water.
      (2) Do not stockpile topsoil within Protection Zones.
      (3) If supplemental topsoil is needed beyond what is available on site, obtain from a local source.

3. Revegetation and Stabilization.
   a. When natural drainage ways, including stream channels, are disturbed, revegetate stream banks with suitable native vegetation, and with appropriate soil stabilization and establishment practices.
   b. All disturbed areas shall be stabilized with appropriate temporary or permanent measures within seven (7) calendar days of final grading or when left idle for more than seven (7) days, excluding maintained haul roads, sediment basins, site runoff storage facilities, and utility corridors less than twenty (20) feet in width.
   c. If work is discontinued for thirty (30) days or more in a disturbed area before the project is completed, appropriate interim controls shall be initiated within seven (7) calendar days from the day that work was discontinued.

4. Inspection and Maintenance
   a. Inspect, maintain, and repair SESC measures during construction until permanent vegetation has been established.
   b. Damaged and ineffective erosion control measures shall be repaired, replaced or supplemented within forty-eight (48) hours of discovery or as soon as field conditions allow.
   c. Straw bales and silt fences shall be inspected weekly and after rainfall event in excess of one half inch to determine required repairs and/or replacement. As a minimum, straw bales are to be

replaced every three (3) months or more frequently as required by the City. If tributary drainage area is greater than one acre, sediment basins shall be constructed in addition to using straw bales and silt fences.

D. Post-Construction Restoration.

1. Vegetation native to the site or plant community shall be restored in areas affected by construction activities. Temporary vegetation, sufficient to stabilize the soil, shall be required on all disturbed areas as needed to prevent soil erosion.

2. Following development, the infiltration capacity shall be restored and compaction of soils shall be reduced by breaking up compaction, adding organic matter, and planting vegetation.

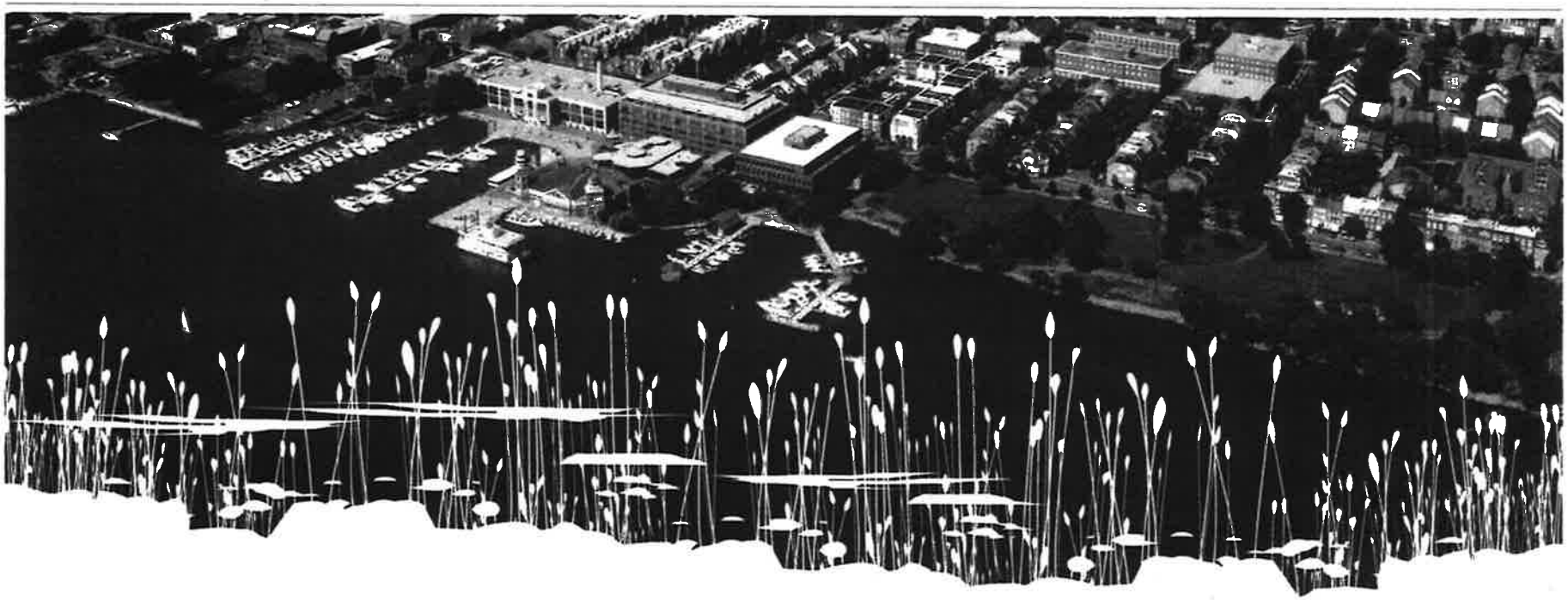
Attachment #5: EPA Water Quality Scorecard for Lakeland, TN

EPA
United States
Environmental Protection
Agency

EPA 231B09001 | October 2009 | http://www.epa.gov

WATERQUALITY SCORECARD

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales



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1 Executive Summary

Many communities across the United States face the challenge of balancing water quality protection with the desire to accommodate new growth and development. These cities and counties are finding that a review of local ordinances beyond just stormwater regulations is necessary to remove barriers and ensure coordination across all development codes for better stormwater management and watershed protection. Local policies, such as landscaping and parking requirements or street design criteria, should complement strong stormwater standards and make it easier for developers to meet multiple requirements simultaneously.

EPA's Water Quality Scorecard was developed to help local governments identify opportunities to remove barriers, and revise and create codes, ordinances, and incentives for better water quality protection. It guides municipal staff through a review of relevant local codes and ordinances, across multiple municipal departments and at the three scales within the jurisdiction of a local government (municipality, neighborhood, and site),[1] to ensure that these codes work together to protect water quality goals. The two main goals of this tool are to: (1) help communities protect water quality by identifying ways to reduce the amount of stormwater flows in a community and (2) educate stakeholders on the wide range of policies and regulations that have water quality implications.

The scorecard is for municipalities of various sizes in rural, suburban, and urban settings, including those that have combined sewers, municipal separate storm sewers, and those with limited or no existing stormwater infrastructure. It can help municipal staff, stormwater managers, planners, and other stakeholders to understand better where a municipality's[2] land development regulations and other ordinances may present barriers or opportunities to implementing a comprehensive water quality protection approach. The scorecard provides policy options, resources, and case studies to help communities develop a comprehensive water quality program.

1 While the watershed scale is the best scale at which to look regionally at water quality protection strategies, it can be difficult to align policies, incentives, and regulations across political boundaries. For purposes of implementation, the largest scale the scorecard uses is the municipality.

2 The term "municipality" as used by the International City/County Management Association (ICMA) refers to local government at both the city and county levels.

2 Background

Growth and development expand communities' opportunities by bringing in new residents, businesses, and investments. Growth can give a community the resources to revitalize a downtown, refurbish a main street, build new schools, and develop vibrant places to live, work, shop, and play. The environmental impacts of development, however, can make it more difficult for communities to protect their natural resources. The U.S. Census Bureau projects that the U.S. population will reach 400 million people by about 2040, which will add continued development pressure on local communities and the environment. Many communities are asking where and how they can accommodate this growth while maintaining and improving their water resources.

Land development directly affects watershed functions. When development occurs in previously undeveloped areas, the resulting alterations to the land can dramatically change the transportation and storage of water. Residential and commercial development creates impervious surfaces and compacted soils that filter less water, which increases surface runoff and decreases groundwater infiltration. These changes can increase the volume and velocity of runoff, the frequency and severity of flooding, and peak storm flows.

Mixed use developments, like main street in Cedar Falls, Iowa, allow for the co-locating of land uses, which decreases impervious surfaces and stormwater runoff problems.

Many communities are already struggling with degraded water bodies and failing infrastructure. For example, *EPA's National Water Quality Inventory: 1996 Report to Congress* indicated that 36 percent of total river miles assessed were impaired.[3] In EPA's 2004 Report to Congress, that percentage increased to 44 percent.[4] Further, a report by the National Academy of Sciences found urban stormwater is estimated to be the primary source of impairment for 13 percent of assessed rivers, 18 percent of lakes, and 32 percent of estuaries—significant numbers given that urban areas cover only 3 percent of the land mass of the United States.[5]

Urban runoff also affects existing wastewater and drinking water systems. EPA estimates that between 23,000 and 75,000 sanitary sewer overflows occur each year in the United States, releasing between 3 and 10 billion gallons of sewage annually.[6] Many of these overflow problems stem from poor stormwater management. Many municipalities—both large and small—must address the impact of existing impervious areas, such as parking lots, buildings, and streets and roads, that have limited or no stormwater management while at the same time trying to find effective and appropriate solutions for new development.

These water quality impairments exist, in part, because historically stormwater management—and indeed stormwater regulation—has focused primarily at the site level. The reasoning was sound: manage stormwater well at the site, and water bodies in the community will be protected. However, as the findings of EPA's National Water Quality Inventory demonstrated, this strategy has not been effective for two main reasons.

First, the site-level approach does not take into account the amount of off-site impervious surfaces. During the development boom from 1995-2005, rain-absorbing landscapes, such as forests, wetlands, and meadows, were transformed into large areas of houses, roads, office buildings, and retail centers. This development created vast areas of impervious cover, which generated significant increases in stormwater runoff. However, the amount of development in the watershed is not simply the sum of the sites within it. Rather, total impervious area in a watershed is the sum of sites developed plus the impervious surface of associated infrastructure supporting those sites, such as roads and parking lots.

Second, federal stormwater regulations focus on reducing pollutants in the runoff—the sediments from roads, fertilizers from lawns, etc.—and not on the amount of stormwater coming from a site. Nevertheless, the increased volume of runoff coming into a municipality's water bodies scours streams, dumps sediments, and pushes existing infrastructure past its capacity limits. Failure to consider the cumulative impact—this loss of natural land, increased imperviousness, and resulting stormwater runoff volumes— on regional water quality and watershed health has led communities to seek stormwater solutions that look beyond site-level approaches.

Communities are recognizing the importance of managing water quality impacts of development at a variety of scales, including the municipal, the neighborhood, and site levels. A range of planning and development strategies at the municipal and neighborhood scales is necessary to address stormwater management comprehensively and systematically. At the same time that stormwater management is moving beyond the site level, it is also evolving beyond hardscaped, engineered solutions, such as basins and curb-and-gutter conveyance, to an approach that manages stormwater through natural processes.

A green infrastructure approach provides a solution to thinking at all three scales as well as addresses the need to change the specific types of practices used on the site. Green infrastructure is a comprehensive approach to water quality protection defined by a range of natural and built systems that can occur at the regional, community, and site scales. At the larger regional or watershed scale, green infrastructure is the interconnected network of preserved or restored natural lands and waters that provide essential environmental functions. Large-scale green infrastructure may include habitat corridors and water resource protection. At the community and neighborhood scale, green infrastructure incorporates planning and design approaches such as compact, mixed-use development, parking reductions strategies and urban forestry that reduces impervious surfaces and creates walkable, attractive communities. At the site scale, green infrastructure mimics natural systems by absorbing stormwater back into the ground (infiltration), using trees and other natural vegetation to convert it to water vapor (evapotranspiration), and using rain barrels or cisterns to capture and reuse stormwater. These natural processes manage stormwater runoff in a way that maintains or restores the site's natural hydrology.

3 *U.S. EPA National Water Quality Inventory: 1996 Report to Congress* **http://www.epa.gov/305b/96report/index.html**

4 *U.S. EPA National Water Quality Inventory: 2004 Report to Congress:* **http://www.epa.gov/owow/305b/2004report/**

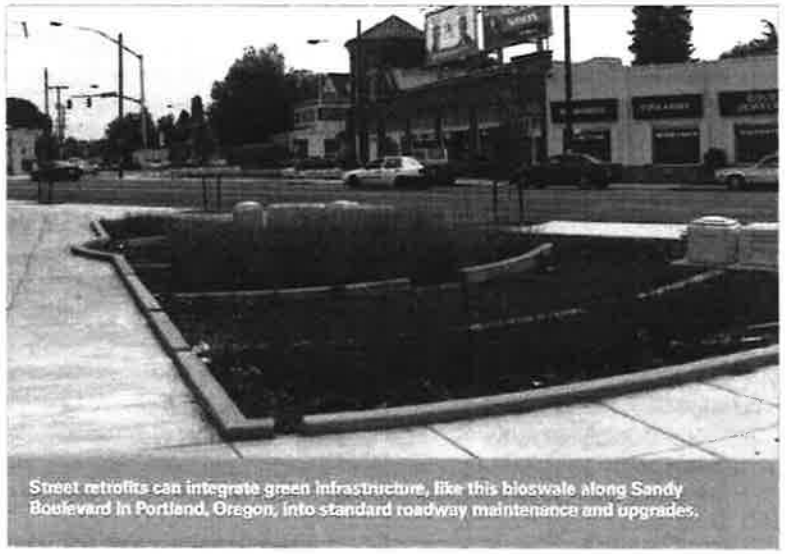
5 *Urban Stormwater Management in the United States, National Research Council of the National Academy of Sciences. 2008:* **http://dels.nas.edu/dels/rpt_briefs/stormwater_discharge_final.pdf**

6 *U.S. EPA National Water Quality Inventory: 2004 Report to Congress:* **http://www.epa.gov/owow/305b/2004report/**

At the municipal scale, decisions about where and how our towns, cities, and regions grow are the first, and perhaps most important, development decisions related to water quality. Preserving and restoring natural landscape features (such as forests, floodplains, and wetlands) are critical components of green infrastructure. By choosing not to develop on and thereby protecting these ecologically sensitive areas, communities can improve water quality while providing wildlife habitat and opportunities for outdoor recreation. In addition, using land more efficiently reduces and better manages stormwater runoff by reducing total impervious areas. Perhaps the single most effective strategy for efficient land use is redevelopment of already degraded sites, such as abandoned shopping centers or underused parking lots, rather than paving greenfield sites.

At the intermediate or neighborhood scale, green infrastructure includes planning and design approaches such as compact, mixed-use development, narrowing streets and roads, parking reduction strategies, and urban forestry that reduce impervious surfaces and better integrate the natural and the built environment.

At the site scale, green infrastructure practices include rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting for non-potable uses such as toilet flushing and landscape irrigation.



Street retrofits can integrate green infrastructure, like this bioswale along Sandy Boulevard in Portland, Oregon, into standard roadway maintenance and upgrades.

These processes represent a new approach to stormwater management that is not only sustainable and environmentally friendly, but cost-effective as well.

Municipalities are realizing that green infrastructure can be a solution to the many and increasing water-related challenges facing municipalities, including flood control, combined sewer overflows, Clean Water Act requirements, and basic asset management of publicly owned treatment systems. Communities need new solutions and strategies to ensure that they can continue to grow while maintaining and improving their water resources. This Water Quality Scorecard seeks to provide the policy tools, resources, and case studies to both accommodate growth and protect water resources.

3 The Water Quality Scorecard

EPA worked with numerous water quality experts, local government staff, developers, urban designers, and others working on land use and water quality issues to develop this Water Quality Scorecard. The purpose of the scorecard is to address water quality protection across multiple scales (municipality, neighborhood, and site) and across multiple municipal departments. This scorecard can help municipal staff, stormwater managers, planners, and other stakeholders to understand better where a municipality's land development regulations and other ordinances may present barriers or opportunities to implementing a comprehensive green infrastructure approach. The tool's two main goals are to: (1) help communities protect water quality by identifying ways to reduce the amount of stormwater flows in a community and (2) educate stakeholders on the wide range of policies and regulations that have water quality implications.

Communities throughout the U.S. are implementing stormwater regulations that require or encourage the use of green infrastructure for managing stormwater on site. These cities and counties are finding that, to better manage stormwater and protect watersheds, green infrastructure policies require a review of many other local ordinances to remove barriers and ensure coordination across all development codes. Local policies, such as landscaping and parking requirements or street design criteria, should complement strong stormwater standards and make it easier for developers to meet multiple requirements simultaneously. At the same time, if these policies support water quality goals, they can independently reduce and better manage stormwater runoff.

How to Use the Scorecard

This scorecard is a locally controlled self-assessment and guide for better incorporating green infrastructure practices at the municipal, neighborhood, and site scales. While one department or agency could complete the tool, the effectiveness of this tool will increase if an interagency process is established to review all local codes and policies that might affect water quality.

Completing the Water Quality Scorecard requires different documents, plans, codes, and guidance manuals. While the legal structure for stormwater management and land development regulation varies among municipalities, the following list contains the most common and relevant documents to complete this scorecard and describes how they can create impervious cover.

- *Zoning ordinances* specify the type and intensity of land uses allowed on a given parcel. A zoning ordinance can dictate single-use low-density zoning, which spreads development throughout the watershed, creating considerable excess impervious surface.

- *Subdivision codes* or ordinances specify development elements for a parcel: housing footprint minimums, distance from the house to the road, the width of the road, street configuration, open space requirements, and lot size—all of which can lead to excess impervious cover.

- *Street standards or road design guidelines* dictate the width of the road, turning radius, street connectivity, and intersection design requirements. Often in new subdivisions, roads tend to be too wide, which creates excess impervious cover.

- *Parking requirements* generally set the minimum, not the maximum, number of parking spaces required for retail and office parking. Setting minimums leads to parking lots designed for peak demand periods, such as the day after Thanksgiving, which can create acres of unused pavement during the rest of the year.

- *Setbacks* define the distance between a building and the right-of-way or lot line and can spread development out by leading to longer driveways and larger lots. Establishing maximum setback lines for residential and retail development will bring buildings closer to the street, reducing impervious cover associated with long driveways, walkways, and parking lots.

- *Height limitations* limit the number of floors in a building. Limiting height can spread development out if square footage is unmet by vertical density.

- *Open space or natural resource plans* detail land parcels that are or will be set aside for recreation, habitat corridors, or preservation. These plans help communities prioritize their conservation, parks, and recreation goals.

- *Comprehensive plans* may be required by state law, and many cities, towns, and counties prepare comprehensive plans to support zoning codes. Most comprehensive plans include elements addressing land use, open space, natural resource protection, transportation, economic development, and housing, all of which are important to watershed protection. Increasingly, local governments are defining existing green infrastructure and outlining opportunities to add new green infrastructure throughout the community.

An initial step in using this tool is to convene appropriate staff to review various sections of the tool and coordinate to both identify opportunities for change and address the potential inconsistencies between policies. The approaches described in this scorecard may be under the control of a number of different local government agencies, including:

- Parks and Recreation
- Public Works
- Planning
- Environmental Protection
- Utilities
- Transportation

The scorecard's review of land use and development policies provides guidance for implementing a range of regulatory and non-regulatory approaches, including land use planning elements, land acquisition efforts, and capital investment policies that can help various municipal agencies integrate green infrastructure into their programs. Internal agency policies and practices, such as maintenance protocols or plan review processes, may be potential barriers as well.

Each policy or approach is described in the context of its potential for providing water quality benefits, although most of the policies have many additional benefits for community livability, human health, air quality, energy use, wildlife habitat, and more. This tool does not provide model ordinance

language. It emphasizes best practices and helps municipalities understand the incremental steps for changing specific policies and internal agency practices. The scorecard divides the tools and policies into four categories:

1. Adopt plans/Educate
2. Remove barriers
3. Adopt incentives
4. Enact regulations

These four categories provide greater structure to the compiled tools by organizing the policies or approaches as incremental changes and updates. These categories may help municipal staff prioritize which tools to work on based on local factors like resources, time, and political support. For example, an appropriate first step in the process of updating local regulations may be to remove a barrier rather than enacting a new regulation. Most policy options avoid specific performance guidance so that the tool is useful to a range of municipalities in different contexts. However, the case studies and resources provide locally appropriate performance measures where possible.

To highlight the diverse nature of green infrastructure approaches, as well as the fact that oversight over these policies resides in various municipal agencies, the scorecard has five sections:

1. Protect Natural Resources (Including Trees) and Open Space
2. Promote Efficient, Compact Development Patterns and Infill
3. Design Complete, Smart Streets that Reduce Overall Imperviousness
4. Encourage Efficient Provision of Parking
5. Adopt Green Infrastructure Stormwater Management Provisions

The five sections organize green infrastructure approaches based on drivers of impervious cover at the municipal, neighborhood, and site scales. Yet all three scales may be in any single section. For example, the parking section will have questions that address the municipal, neighborhood and site level considerations.

The scorecard describes alternative policy or ordinance information that, when implemented, would support a comprehensive green infrastructure approach, and will allow the municipality to determine where, in the broad spectrum of policy implementation, their policies fall.

A Note about the Point System

The tool includes a point system to make it easier to evaluate and improve local programs. The municipality can decide whether to use the point system at all. If the point system is used, municipalities can set locally appropriate thresholds and goals.

Governments could choose to use the point system in many different ways, including:

- State governments could require municipalities to complete the Water Quality Scorecard and establish measures for improvement over different permit cycles. For example, a municipality might have to improve its score by some number of points before the next permit cycle.
- Local governments could determine a score based on existing programs and policies and then set goals from this baseline. Local targets may include incremental yearly improvements or achieving additional points in a particular section, such as "Encourage Efficient Parking Supply" or "Protect Natural Resources and Open Space."
- Stakeholders such as watershed groups or environmental organizations could complete the scorecard and then provide feedback and information assistance to the local government about sections within the scorecard that received few points and might be an area for improvement.
- The total score or scores in certain sections could educate elected officials, decision makers, and others about the importance of these issues and the role of local policies in addressing them.
- A lack of points in one section may alert a municipality that a certain area, such as parking, lacks local ordinances that support green infrastructure and may be ripe for improvement.
- Variation in the number of points achieved across the five sections may help a municipality to better assess local sources of impervious cover and potential for the introduction of green infrastructure.

Because the scorecard is intended for use by a range of community types and sizes in locations throughout the U.S., please note that no single municipality will be able to receive every point. Some questions and points may only be

A green roof located on the Friends Center in downtown Philadelphia, Pennsylvania provides stormwater management capacity and adds aesthetic value to this dense urban environment.

available to urban municipalities while others may only be available to those in a suburban or rural setting.

Tips for Building Relationships Between Stormwater Managers, Land Use Planners, and Other Local Officials

Effective stormwater management requires coordination and collaboration across many different municipal departments and processes. Below are some ideas for incorporating stormwater management in traditional planning processes and programs.

- Include both land use planners and stormwater managers in pre-concept and/or pre-application meetings for potential development projects.
- Use local government sites (e.g., schools, regional parks, office buildings, public works yards) as demonstration projects for innovative land use strategies and stormwater management. Form a team that includes land use planners, stormwater managers, parks and school officials, etc. to work out the details.
- Include stormwater managers in the comprehensive plan process to incorporate overall watershed and stormwater goals.
- Make sure that both land use planners and stormwater managers are involved in utility and transportation master planning.
- Allow stormwater managers to be involved in economic development planning, especially for enterprise zones, Main Street projects, and other projects that involve infill and redevelopment. Encourage stormwater managers to develop efficient watershed-based solutions for these plans.
- Develop cross training and joint activities that allow land use planners, stormwater managers, and transportation, utility, and capital projects planners to explore the improved integration of various land use and stormwater processes.
- Hold staff trainings with speakers that are knowledgeable about smart growth and stormwater management. Alternately, encourage land use planners, stormwater managers, and other local officials to attend trainings on this topic as a team.

Table 1: Water Quality Scorecard Quick Reference Guide

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales (SUMMARY)

Policy Question	Goal
PROTECT NATURAL RESOURCES (INCLUDING TREES) AND OPEN SPACE	
1A. NATURAL RESOURCE PROTECTION	
Are development policies, regulations, and incentives in place to protect natural resource areas and critical habitat?	Protect natural resource areas (e.g., forests, prairies) and critical habitat (e.g., conservation corridors, buffer zones, wildlife preserves) from future development.
Are no-development buffer zones and other protective tools in place around wetlands, riparian areas, and floodplains to improve/protect water quality?	Protect critical areas such as wetlands, floodplains, lakes, rivers, and estuaries with a mandatory no-development buffer.
Does the community have protection measures for source water protection areas through land use controls and stewardship activities?	Protect source water areas from current or potential sources of contamination.
1B. OPEN SPACE PROTECTION	
Does the jurisdiction have adequate open space in both developed and greenfield areas of the community?	Create open networks throughout a community that serve a dual function of providing recreational areas and assisting in management of stormwater runoff.
1C. TREE PRESERVATION	
Does the local government have a comprehensive public urban forestry program?	Protect and maintain trees on public property and rights-of-way and plant additional trees to enhance the urban tree canopy.
Has the community taken steps to protect trees on private property?	Preserve trees on private property and require replacement when trees are removed or damaged during development.
Do local codes encourage or require street trees as part of road and public right-of-way capital improvement projects?	Leverage existing capital funds to plant more street trees and add multiple benefits to the public right-of-way.
PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL	
2A. INFILL AND REDEVELOPMENT	
Are policy incentives in place to direct development to previously developed areas?	Municipalities implement a range of policies and tools to direct development to specific areas.
2B. DEVELOPMENT IN AREAS WITH EXISTING INFRASTRUCTURE	
Is the jurisdiction directing growth to areas with existing infrastructure, such as sewer, water, and roads?	Adopt policies, incentives, and regulations to direct new development to areas that have infrastructure, such as water and sewer.
2C. MIXED-USE DEVELOPMENT	
Are mixed-use and transit-oriented developments allowed or encouraged?	Revise codes and ordinances to allow for the "by right" building of mixed-use and transit-oriented developments.

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales (SUMMARY) continued

Policy Question	Goal
DESIGN COMPLETE, SMART STREETS THAT REDUCE OVERALL IMPERVIOUSNESS	
3A. STREET DESIGN	
Do local street design standards and engineering practices encourage streets to be no wider than is necessary to move traffic effectively? Do policies allow narrow neighborhood streets designed to slow traffic and create safer conditions for pedestrians and bicyclists?	Appropriate street widths allow narrower lanes for certain street types, thereby reducing overall imperviousness.
Are shared driveways, reduced driveway widths, two-track driveways, and rear garages and alleys encouraged for all single-family developments?	Encourage alternative forms and decreased dimensions of residential driveways and parking areas.
3B. GREEN INFRASTRUCTURE ELEMENTS AND STREET DESIGN	
Are major street projects required to integrate green infrastructure practices as a standard part of construction, maintenance, and improvement plans?	Formally integrate green infrastructure into standard roadway construction and retrofit practice.
Do regulations and policies promote use of pervious materials for all paving areas, including alleys, streets, sidewalks, crosswalks, driveways, and parking lots?	Build and retrofit these surfaces with pervious materials to reduce stormwater runoff and its negative impacts.
ENCOURAGE EFFICIENT PROVISION OF PARKING	
4A. REDUCED PARKING REQUIREMENTS	
Does your local government provide flexibility regarding alternative parking requirements (e.g., shared parking, off-site parking) and discourage over-parking of developments? Do parking requirements vary by zone to reflect places where more trips are on foot or by transit?	Match parking requirements to the level of demand and allow flexible arrangements to meet parking standards.
4B. TRANSPORTATION DEMAND MANAGEMENT ALTERNATIVES	
Does the municipality allow developers to use alternative measures such as transportation demand management or in-lieu payments to reduce required parking?	Provide flexibility to reduce parking in exchange for specific actions that reduce parking demands on site.
4C. MINIMIZING STORMWATER FROM PARKING LOTS	
Are there requirements for landscaping designed to minimize stormwater in parking lots?	Require substantial landscaping to help reduce runoff.
ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS	
5A. GREEN INFRASTRUCTURE PRACTICES	
Are green infrastructure practices encouraged as legal and preferred for managing stormwater runoff?	Make all types of green infrastructure allowed and legal and remove all impediments to using green infrastructure (including for stormwater requirements), such as limits on infiltration in rights-of-way, permit challenges for green roofs, safety issues with permeable pavements, restrictions on the use of cisterns and rain barrels, and other such unnecessary barriers.
Do stormwater management plan reviews take place early in the development review process?	Incorporate stormwater plan comments and review into the early stages of development review/site plan review and approval, preferably at pre-application meetings with developers.

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales (SUMMARY) continued

	Policy Question	Goal
	Do local building and plumbing codes allow harvested rainwater use for exterior uses such as irrigation and non-potable interior uses such as toilet flushing?	Ensure that the municipality allows and encourages stormwater reuse for non-potable uses.
	Are provisions available to meet stormwater requirements in other ways, such as off-site management within the same sewershed or "payment in lieu" of programs, to the extent that on-site alternatives are not technically feasible?	Allow off-site management of runoff while still holding developers responsible for meeting stormwater management goals.
5B.	**MAINTENANCE/ENFORCEMENT**	
	Does your stormwater ordinance include monitoring, tracking, and maintenance requirements for stormwater management practices?	Incorporate monitoring, tracking, and maintenance requirements for stormwater management practices into your municipal stormwater ordinance.

GETTING STARTED

Below are suggested steps to help complete the Water Quality Scorecard:

Step 1. Review the scorecard to identify which agencies, departments, or personnel will be required to complete each section.

Step 2. Convene appropriate staff to review various sections of the tool, and work together to ensure that updates and changes to codes, policies, and internal processes align well with other agency changes.

Step 3. Collect existing ordinances and policies that will be necessary references to complete the scorecard.

Step 4. Coordinate between appropriate agencies or departments to complete the scorecard.

Please indicate by your signature that you have reviewed the tool with all co-signees of this document (name, department, and date):

Dail M Smith ENGINEERING 9/30/15

Step 5: Identify sections of the scorecard and/or specific policy questions that should be prioritized for immediate revision or update.

Step 6: Identify short-, medium-, and long-term goals and strategies for revising local policies to better support green infrastructure.

1 Protect Natural Resources (Including Trees) and Open Space

Sensitive Natural Lands/Critical Area Protection

QUESTION: Are development policies, regulations, and incentives in place to protect natural resource areas and critical habitat?

GOAL: Protect natural resource areas (e.g., forests, prairies) and critical habitat (e.g., conservation corridors, buffer zones, wildlife preserves) from future development.

WHY: Protection of significant tracts of critical lands and wildlife habitat will aid in protecting and improving water quality by increasing infiltration and groundwater recharge, preventing erosion and contamination of ground water and surface water resources, and protecting sources of drinking water.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Identify and map critical natural resource areas (e.g., steep slopes, wildlife habitat, forests, drinking water source areas).	1	1	COMPLETE NATURAL RESOURCES INVENTORY
The local comprehensive plan contains a natural resource protection element with goals calling for preservation of identified critical natural resource areas.	1	1	INCORPORATE NRI
Identify key natural resource areas for protection in jurisdiction's parks and open space plan.	1	0	
Assist landowners in identifying sensitive natural areas and laying out developments to avoid such areas.	1	1	
Local plans establish and enforce areas which are available for development and which lands are a priority for preservation.	1	1	
REMOVE BARRIERS:			
Protection of sensitive natural areas and wildlife habitat qualifies for credit towards local open space dedication and set-aside requirements.	1	1	
ADOPT INCENTIVES:			
Provide financial support to or collaborate with land trusts to acquire critical natural areas.	1	1	
Establish a dedicated source of funding for open space acquisition and management (e.g., bond proceeds, sales tax).	2	0	
Adopt a transferable developments rights program to provide an incentive for landowners to preserve sensitive natural lands and wildlife habitat.	1	0	
		6 PAGE TOTAL	◀ CARRY THIS SUBTOTAL TO NEXT PAGE =

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Land use regulations provide for the creation of cluster and conservation subdivision on the periphery of urban growth areas to encourage preservation of intact blocks of sensitive natural areas.	1	1	
ENACT REGULATIONS:			
Adopt regulations to protect steep slope, hillsides, and other sensitive natural lands (e.g., by limiting development on slopes > 30% or requiring larger lot sizes in sensitive areas).	2	2	
Adopt wildlife habitat protection regulations aimed at preserving large contiguous blocks of habitat areas.	2	0	
Create agriculture/natural resource zoning districts (e.g., minimum lot size of 80 acres and larger) to preserve agricultural areas and forests.	2	0	

3 PAGE TOTAL + SUBTOTAL FROM PREVIOUS PAGE 6 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 9

1.A.2a Protection Of Water Bodies/Aquifers

QUESTION: Are no-development buffer zones and other protective tools in place around wetlands, riparian areas, and floodplains that improve/protect water quality?

GOAL: Protect critical areas such as wetlands, floodplains, lakes, rivers, and estuaries with a mandatory no-development buffer.

WHY: The use of these practices will reduce pollutant loads and hydrologic alterations to water bodies.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Identify and map critical water resource areas.	1	1	
The local comprehensive plan contains a water quality protection element with goals calling for protection of identified water bodies and other water resource areas such as wetlands.	1	1	
Identify key critical water resource areas for protection in jurisdiction's parks and open space plan.	1	0	
Cooperate in developing regional approaches to watershed protection and stormwater management.	1	1	
REMOVE BARRIERS:			
Wetlands and other water bodies and buffer areas qualify for credit against local open space dedication/set-aside regulations.	1	1	
ADOPT INCENTIVES:			
Protected water bodies and buffer areas qualify for twice the credit (or more) against open space requirements set by the municipality.	1	0	
Restoration of degraded riparian/wetland areas qualifies for additional open space credit within the local municipal system.	1	0	
Transfer of density from protected riparian areas/buffers to upland portions of development sites.	1	1	
ENACT REGULATIONS:			
Riparian and wetland buffer areas required by local land use regulations · Buffer is at least 50 feet (as measured from the top of bank) = 1 point · Buffer is at least 100 feet (as measured from the top of bank) = 2 points · Buffer is greater than 100 feet (as measured from the top of bank) = 3 points	1 to 3	2	Minimum Buffer is 50ft. on either side
Critical water resource areas cannot be counted in calculating allowable density on a site (e.g., on a 200-acre site with 50 acres of wetlands, only 150 acres can be used to calculate density under zone district regulations, and only those 150 acres may be developed).	1	0	

PAGE TOTAL: 7 + SUBTOTAL FROM PREVIOUS PAGE: 9 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE: 16

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Development in floodplains is prohibited or must demonstrate no acverse impacts upstream and downstream (See resources below for details on "no adverse impact" approach to floodplain management)	2	2	
Stormwater quality and quantity performance standards exist for development sites (e.g., restrictions on sedimentation levels, pre/post development flows).	1	0	
Local regulations require restoration of degraded riparian/wetland areas on a development site.	1	0	
Compensation for damage to riparian/wet and areas must be on a minimum 2:1 basis on- or off-site.	1	0	
Performance standards exist and are well enforced for stormwater discharges to wetlands that protect the hydrologic regimes and limit pollutant loads.	1	0	

2 PAGE TOTAL + 16 SUBTOTAL FROM PREVIOUS PAGE = 18 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

1.A.2b

Protection Of Water Bodies/Aquifers

QUESTION: Does the community have protection measures for source water protection areas through land use controls and stewardship activities?

GOAL: Protect source water areas from current or potential sources of contamination.

WHY: These practices will help safeguard community health, reduce the risk of water supply contamination, and potentially reduce water treatment costs.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Local land use plans identify aquifer recharge/source water areas and recommend protective measures.	1	N/A	NO RECHARGE AREAS IN CITY LIMITS
Require that all stormwater inlets carry a notice regarding discharge to receiving waters.	1	0	
Map and publish wellhead and aquifer recharge areas to alert developers to potential restrictions.	1	N/A	NO WELL HEADS IN CITY
ADOPT INCENTIVES:			
Identification of drinking water source protection and aquifer recharge areas with a dedicated funding source in place to purchase and protect such areas.	1	N/A	
Protection of critical water source areas qualifies for additional credit towards local open space requirements.	1	0	
ENACT REGULATIONS:			
Adopt well-head protection regulations/zones to prevent incompatible development and uses.	1	N/A	
Adopt aquifer protection regulations/zones to prevent incompatible development and uses.	2	N/A	

PAGE TOTAL 0 + SUBTOTAL FROM PREVIOUS PAGE 18 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 18

1.B Open Space Protection

1.B.1

QUESTION: Does the jurisdiction have adequate open space in both developed and greenfield areas of the community?

GOAL: Create open space networks throughout a community that serve a dual function of providing recreational areas and assisting in the management of stormwater runoff.

WHY: In addition to providing open space throughout a community as an amenity, such a network can provide large areas that contribute little to stormwater loads and can provide large areas for the infiltration and purification of stormwater.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Adopt a community-wide open space and parks plan.	1	1	
The local comprehensive plan contains an open space/parks element that recognizes the role of open space in sustainable stormwater management.	1	1	
REMOVE BARRIERS:			
Green infrastructure practices count towards local open space set aside requirements up to 50% of total.	1	1	
Allow and encourage retrofits of abandoned or underutilized public lands to serve as permanent or temporary open space and green infrastructure sites.	1	N/A	
ADOPT INCENTIVES:			
Additional open space credits are eligible for green stormwater management facilities improved/designed for public recreational purposes.	1	0	
Provide credit against open space impact fees for green roofs.	1	0	
ENACT REGULATIONS:			
Adopt neighborhood policies and ordinances that work to create neighborhood—not development site—open space amenities that are within ¼ to ½ mile walking distance from every residence.	1	1	
Adopt an open space impact fee to purchase passive open space that can assist in stormwater management.	1	0	
Adopt open space dedication and/or set aside requirements based on the demand generated by the development. As a baseline, use the average open space requirements adopted by the National Recreation and Park Assn. (e.g., 10 acres of community and neighborhood parks for every 1,000 persons in a development or fraction thereof).	1	1	

5 PAGE TOTAL + 18 SUBTOTAL FROM PREVIOUS PAGE = 23 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

1.C Tree Protection

1.C.1

QUESTION: Does the local government have a comprehensive public urban forestry program?

GOAL: Protect and maintain trees on public property and rights-of-way and plant additional trees to enhance the urban tree canopy.

WHY: Mature trees provide multiple community benefits, reduce overall stormwater runoff, and improve stormwater quality.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Survey and inventory existing trees on public lands and street rights-of-way. Document the characteristics and location of street trees and urban tree canopy to inform public tree planting, adoption, and maintenance programs.	1	1	
Select tree species based on known performance for managing stormwater runoff. Publish list and make widely available for homeowners/others that plant street trees.	1	1	
Conduct education and outreach about tree protection, proper maintenance, and replanting opportunities through printed materials, workshops, events, and signage.	1	1	
Adopt a policy to protect existing trees on local government development sites (e.g., municipal parking lots, municipal buildings).	1	1	
Maintain an active tree maintenance program for public trees, including pest control, pruning, watering, and similar measures.	1	1	
REMOVE BARRIERS:			
Acknowledge trees as part of community infrastructure and develop a coordinated design for locating public utilities to provide enough space for mature tree canopy and root development.	1	1	
ADOPT INCENTIVES:			
Provide free or reduced-price trees to homeowners to be used as street trees.	1	1	
ENACT REGULATIONS:			
Require any public trees removed or damaged during construction associated with private development to be replaced on- or off-site with an equivalent amount of tree caliper (e.g., remove a 24-inch diameter tree/replace with 6 four-inch diameter trees).	1	1	
Adopt construction protection rules for all public trees (e.g., fencing, no storage of hazardous materials, avoid cutting into root zones).	1	1	

PAGE TOTAL 9 + SUBTOTAL FROM PREVIOUS PAGE 23 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 32

QUESTION: Has the community taken steps to protect trees on private property?

GOAL: Preserve trees on private property and require replacement when trees are removed or damaged during development.

WHY: Mature trees provide multiple environmental, economic, and community benefits, including improved water and air quality, reduced heat island effects, lowered energy costs, and improved community aesthetics.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Community plans specifically include tree preservation and replacement as community goals.	1	1	
Conduct educational sessions for builders and developers regarding appropriate tree protection techniques and/or publish a technical tree protection manual.	1	1	
Follow maintenance and inspection timelines and meet canopy goals and milestones by ensuring old trees survive, replacing dead or diseased trees, and planting new trees.	1	N/A	
REMOVE BARRIERS:			
Set up maintenance and inspection agreements for private properties meeting stormwater requirements or receiving stormwater fee credit for trees.	1	0	
Set up long-term maintenance and inspection schedules for trees on public lands.	1	1	
ADOPT INCENTIVES:			
Support local non-profits that plant trees and provide educational services.	1	0	
Provide financial incentives for tree purchases and planting.	1	0	
A tree fund has been established to receive in-lieu payments when trees must be removed from a development site to accommodate permitted projects.	1	1	
Trees of a specified minimum size count towards a percentage of stormwater management requirements (e.g., partial credit given for each mature tree exceeding a specified height or canopy size).	1	0.	
Trees over a specified minimum size (e.g., 3-inch caliper) protected during development are credited towards landscaping requirements. · meeting the established landscape requirement = 1 point · exceeding the established landscape requirement = 2 points	1 to 2	1	

PAGE TOTAL 5 + SUBTOTAL FROM PREVIOUS PAGE 32 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 37

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ENACT REGULATIONS:			
Require permits before removing trees on proposed development or redevelopment sites. Provide fines and/or stop-work authority for permit violations.	1	1	
Set minimum tree preservation standards for new development sites.	1	1	
Require site plans or stormwater plans to include tree preservation.	1	1	
Require/allow tree replacement off-site for infill sites.	1	1	

4 PAGE TOTAL + SUBTOTAL FROM PREVIOUS PAGE 37 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 41

1.C.3

QUESTION: Are street trees encouraged or required as part of road and public right-of-way capital improvement projects?

GOAL: Leverage existing capital funds to plant more street trees and add multiple benefits to the public right-of-way.

WHY: Street trees can help manage and reduce stormwater runoff while providing multiple public and environmental benefits.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Local comprehensive and transportation plans support the planting of street trees by all private and public development projects.	1	1	
Capital improvement plans include tree planning as part of project budgets.	1	1	
ADOPT INCENTIVES:			
Offer incentives, such as reduced setbacks or increased building densities, in exchange for additional tree preservation beyond ordinance requirements.	1	1	
ENACT REGULATIONS:			
All private and public developments are required to plant street trees in accordance with size, spacing, and other local government requirements.	1	1	
New street designs and redesigns of existing streets take into account space for tree development and require necessary surface area and volume of soil dependent on type of tree species selected (this includes lateral root growth as well as direct downward growth to accommodate mature tree canopy and roots without adversely affecting other utilities).	1	1	
Street specifications require permeable paving for sidewalks and other surfaces to reduce stormwater runoff and allow street trees to benefit from the available water.	1	0	

PAGE TOTAL: 5

SUBTOTAL FROM PREVIOUS PAGE: + 41

▼ **Total score for SECTION 1: PROTECT NATURAL RESOURCES (INCLUDING TREES) AND OPEN SPACE** = 46 (TOTAL POINTS AVAILABLE: 82)

This section has been reviewed and scored by DAVID SMITH

Department name ENGINEERING Signee

Resources

- Planner's Guide to Wetland Buffers for Local Governments, Environmental Law Institute: ***http://www.elistore.org/reports_detail.asp?ID=11272***
- Mertes, James D. and James R. Hall. Park, Recreation, Open Space and Greenway Guidelines. National Recreation and Park Association, 1996.
- Center for Watershed Protection guidance on aquatic buffers: ***http://www.cwp.org/Resource_Library/Restoration_and_Watershed_Stewardship/perviousarea.htm***
- "Protecting Stream and River Corridors: Creating Effective Local Riparian Buffer Ordinances," Carl Vinson Institute of Government, The University of Georgia: ***http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf***
- No Adverse Impact Floodplain Management, Association of State Floodplain Managers: ***http://www.floods.org/index.asp?menuID=349&firstlevelmenuID=187&siteID=1***
- Riparian Toolbox: Model Regulations and Legal Issues, Long Island Sound Study: ***http://www.longislandsoundstudy.net/riparian/legal.htm***
- Model Ordinances to Protect Local Resources: Aquatic Buffers, U.S. EPA: ***http://www.epa.gov/owow/nps/ordinance/osm1.htm***
- Duerksen, Christopher and Cara Snyder. Nature-Friendly Communities: Habitat Protection and Land Use Planning. Island Press, 2005.
- City Trees: Sustainability Guidelines and Best Practices: ***http://www.treetrust.org/pdf/community-forestry-city-trees-bonestroo.pdf***
- Guide to Setting Urban Tree Canopy Goals, American Forests: ***http://www.americanforests.org/resources/urbanforests/treedeficit.php***
- Urban Forestry Manual, Center for Watershed Protection: ***http://www.cwp.org/forestry/part3forestrymanual.pdf*** (pg. 69))
- Duerksen, Christopher and Suzanne Richman, "Tree Conservation Ordinances." American Planning Association. 1993: Planning Advisory Service Report No. 446.
- Duerksen, Christopher , Mowery, M. and McGlyn M. "Tree Preservation." Zoning Practice. July 2006: American Planning Association, Volume 23 Number 7.
- "Trees for green streets: An illustrated guide," Portland Metro: ***http://www.metro-region.org/index.cfm/go/by.web/id=26337***
- *Tree Preservation Information Guide, Portland, Oregon:* ***http://www.sustainableportland.org/shared/cfm/image.cfm?id=72545***
- Storm Water Pollution Prevention Plan (SWPPP) Guide, U.S. EPA: ***http://cfpub.epa.gov/npdes/stormwater/swppp.cfm***
- Center for Urban Forest Research, U.S. Forest Service: ***http://www.fs.fed.us/psw/programs/cufr/***
- Urban Forest Policy and Management, U.S. Forest Service: ***http://www.fs.fed.us/psw/programs/cufr/research/studies.php?TopicID=1***
- Plants for Stormwater Design Volume II, Great River Greening: ***http://www.greatrivergreening.org/_downloads/PSD%20II%20Sample.PDF***

Case Studies

- Alachua County, Florida's land conservation and acquisition program, *Alachua County Forever,* has conserved over 17,000 acres of environmentally sensitive land: ***http://www.alachuacounty.us/government/depts/epd/land/filesforms.aspx***
- Baltimore County, Maryland's Master Plan 2010 designates land management areas that include agricultural preservation areas and resource preservation areas: ***http://www.baltimorecountymd.gov/Agencies/planning/masterplanning/smartgrowth.html***
- King County, Washington's Greenprint Project is an open space and resource conservation strategy that focuses on land acquisition, restoration projects, regulatory changes and protection within the urban growth boundary: ***http://dnr.metrokc.gov/wlr/greenprint/about.htm***
- The Pennsylvania Horticultural Society's *Philadelphia Green* program revitalizes and maintains abandoned land and public spaces by partnering with government, businesses and the community: ***http://www.pennsylvaniahorticulturalsociety.org/phlgreen/about.html***
- Chicago, Illinois's Open Space Impact Fee Ordinance charges a fee associated with residential development building permits and spends the funds on acquisition of neighborhood open space in the same area where development occurs: ***http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Buildings%2FContent&deptMainCategoryOID=-536901233&entityName=Buildings&topChannelName=Dept&contentOID=536988877&contenTypeName=COC_EDITORIAL***
- Lenexa, Kansas's Watershed Management Plan includes erosion and sediment control, stream buffers, subwatershed protection and

improvement, and design standards for the city's uniform development code: ***https://www.ci.lenexa.ks.us/Planning/compplan/Overview/***

- The Maryland Cooperative Extension Service provides a fact sheet on how to design, plant and maintain a riparian forest buffer: ***http://www.riparianbuffers.umd.edu/fact/FS725.html***
- Vermont's Department of Environmental Conservation offers grants to conservation organizations to purchase or receive donated river corridor easements on private property within priority stretches of river: ***http://www.anr.state.vt.us/dec/waterq/rivers/docs/rv_RiverCorridorEasementGuide.pdf***
- The U.S. Department of Agriculture's Natural Resources Conservation Service provides guidance on riparian buffers through the Ohio Lake Erie Buffer Program: ***http://www.oh.nrcs.usda.gov/programs/Lake_Erie_Buffer/riparian.html***
- Davidson, North Carolina requires a public park within a five minute walk of all housing units, providing multifunctional neighborhood open space: ***http://www.ci.davidson.nc.us/index.aspx?NID=576***
- San Jose, California gives post-construction stormwater treatment credit for new and existing trees in close proximity to impervious areas: ***http://www.sanjoseca.gov/planning/stormwater/Policy_6-29_Memo_Revisions.pdf***
- Portland, Oregon gives a stormwater fee discount for trees over 15 feet tall: ***http://www.portlandonline.com/bes/index.cfm?c=43444&#types***
- Portland, Oregon also gives a tree credit for meeting local stormwater requirements: ***http://www.portlandonline.com/shared/cfm/image.cfm?id=93075***
- Portland, Oregon Parks and Recreation and Bureau of Development Services regulate tree cutting on private property and public property: ***http://www.portlandonline.com/parks/index.cfm?c=39712***
- New York City requires street tree planting for a range of developments and zoning increases: ***http://www.nyc.gov/html/dcp/html/street_tree_planting/index.shtml***
- Charlottesville, North Carolina has set goals for achieving a 40% minimum urban tree canopy: ***http://www.charlottesville.org/Index.aspx?page=1745*** (Chapter 8, pgs. 184-187)

2 PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL

2.A SUPPORT INFILL AND REDEVELOPMENT

2.A.1

QUESTION: Are policy incentives in place to direct development to previously developed areas?

GOAL: Municipalities implement a range of policies and tools to direct development to specific areas.

WHY: Municipalities can realize a significant reduction in regional runoff if they take advantage of underused properties, such as infill, brownfield, or greyfield sites. Redeveloping already degraded sites such as abandoned shopping centers or underutilized parking lots rather than paving greenfield sites for new development can dramatically reduce total impervious area while allowing communities to experience the benefits and opportunities associated with growth.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Local plans identify potential brownfield and greyfield sites, and support their redevelopment.	1	N/A	DEVELOPING CITY, NO BROWNFIELDS
Capital improvement plans include infrastructure improvements (water, sewer, road, sidewalk, etc. upgrades) for identified brownfield and greyfield sites.	1	N/A	
Educate lending and financial institutions about benefits and local priorities of directing development to existing areas.	1	0	
Conduct outreach to the community to ensure support for local forms and patterns of development.	1	1	
REMOVE BARRIERS:			
Establish a brownfields program to remove uncertainty regarding cleanup and liability issues.	1	N/A	
ADOPT INCENTIVES:			
Provide incentives such as density bonuses and accelerated permitting for brownfield and greyfield sites.	1	N/A	
Adopt funding mechanisms for remediating/redeveloping brownfield and greyfield sites.	1	N/A	
Streamline permitting procedures to facilitate infill and brownfield redevelopment plan review.	1	N/A	
Establish tax increment financing (TIF) districts to encourage redevelopment.	1	1	NEW LAKELAND DEVELOPMENT AT WORK
ENACT REGULATIONS:			
In local codes, ordinances, and policies, the municipality differentiates between greenfield and infill development.	1	1	
		3 PAGE TOTAL	◀ CARRY THIS SUBTOTAL TO NEXT PAGE = 3

2.B.1

QUESTION: Does the municipality direct growth to areas with existing infrastructure, such as sewer, water, and roads?

GOAL: Adopt policies, incentives, and regulations to direct new development to areas that have infrastructure, such as water and sewer. However, in situations where development is in areas with no sewer infrastructure, permitting alternative treatment options that can allow for higher density development or clustering of houses will reduce the overall water quality impact.

WHY: Sewer and water authorities can play a major role in directing a region's growth by determining when and where new infrastructure investment will occur. Well-drafted facility planning areas can direct growth by providing sewer service in areas least likely to impact water resources.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Local plans recommend/establish urban growth areas and urban growth boundaries. Development is encouraged within urban growth boundaries and discouraged outside of them.	1	0	
Analyze which areas within the jurisdiction are appropriate for higher density development based on existing infrastructure capacity, cost of providing new services, and access.	2	2	
Capital improvement plans for public infrastructure (roads, water, sewer, etc.) target funding inside urban growth boundary.	2	0	
Local sewer/water authority capital improvement plans follow development policies established in local comprehensive plans and target areas with existing development/infrastructure.	1	1	
REMOVE BARRIERS:			
Development standards addressing landscaping, buffering, parking and open space are tailored for infill areas to avoid creating unnecessary hurdles to development (e.g., imposing suburban parking requirements in high-density infill areas).	2	0	
Remove prohibitions on accessory dwelling units in infill areas to increase density of development.	2	2	
Off-site, regional water retention/detention encouraged/allowed to avoid costly on-site retention in densely developed infill areas and to provide benefit to priority retrofit sites, such as schools.	2	0	
Package plants and other wastewater treatment trains are encouraged for development in limited circumstance areas where growth is appropriate but sewers/treatment capacity does not exist.	1	1	

6 PAGE TOTAL + SUBTOTAL FROM PREVIOUS PAGE 3 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 9

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Technical information and analysis on the effectiveness of various treatment systems are readily available to developers. Local governments have determined which systems work best for their soil conditions and topography and have made this information available to the development community.	1	0	
Allow a wide variety of housing types and sizes within infill areas and reduced minimum lot sizes.	1	1	
ADOPT INCENTIVES:			
Increase development densities and allowable height in infill areas.	1	0	
Reduce impact fees for infill development based on less demand for new infrastructure.	1	0	
Create development incentives for green roofs (e.g., increased floor area ratio [FAR] bonus, additional building height).	1	0	
Include provision in stormwater management requirement that reduces on-site management requirements for projects that decrease total imperviousness on previously developed sites.	1	0	
ENACT REGULATIONS:			
Zoning and land development regulations implement urban service areas/ urban growth boundary policies by restricting development in outlying areas.	1	0	
Adopt adequate public facility and concurrency ordinances that require adequate public infrastructure to be available when development comes on line (e.g., water, sewer, roads).	1	1	
Adopt large-lot/agricultural zoning (e.g., 1 unit/160 acres) on fringe of city to restrict inappropriate greenfield development.	1	1	
Enact transitional compatibility standards to ensure that new denser infill development is compatible with existing neighborhoods/adjacent development.	1	1	

4 PAGE TOTAL + 9 SUBTOTAL FROM PREVIOUS PAGE = 13 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

2.C ENCOURAGE MIXED-USE DEVELOPMENTS

2.C.1

QUESTION: Are mixed-use and transit-oriented developments allowed or encouraged?

GOAL: Revise codes and ordinances to allow for the "by right" building of mixed-use and transit-oriented developments.

WHY: Mixed-use developments allow for the co-locating of land uses, which decreases impervious surfaces associated with parking and decreases vehicle miles traveled—resulting in a reduction of hydrocarbons left on roadways and reduced air deposition.

Transit-oriented development (TOD) produces water quality benefits by reducing: (1) land consumption due to smaller site footprints; (2) parking spaces and the impervious cover associated with them; and (3) average vehicle miles traveled, which, in turn, reduces deposition of air pollution into water bodies.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Comprehensive plans identify appropriate areas for higher-density mixed-use developments (e.g., at transit stops) and recommend policies to encourage their development.	1	1	
Local capital improvement plans and funding are targeted to areas appropriate for mixed-use development.	2	0	
REMOVE BARRIERS:			
Zoning ordinances can create by-right mixed-use and transit-oriented development districts or overlays through amendments.	1	1	
Initiate map amendments to designate mixed-use and transit-oriented development areas, eliminating the need for developers to secure zoning amendments.	1	0	
ADOPT INCENTIVES:			
Parking requirements are reduced to reflect decreased automobile use.	1	1	
Credit given for adjacent on-street parking, which can count for local parking requirements.	1	1	
Shared parking and alternative parking arrangements encouraged.	1	1	
Mixed-use districts/areas feature increased densities and height.	1	1	
Accessory parking structures are not counted against maximum floor area ratio (FAR) on a site.	1	NA	

6 PAGE TOTAL + 13 SUBTOTAL FROM PREVIOUS PAGE = 19 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ENACT REGULATIONS:			
Zoning code requires a minimum mix of uses and minimum density in designated mixed-use and transit-oriented development areas.	1	1	
Auto-oriented uses and drive-throughs are restricted or prohibited in mixed-use and transit-oriented development areas.	1	0	

1

PAGE TOTAL

SUBTOTAL FROM PREVIOUS PAGE

\+ 19 = 20

▼ **Total score for SECTION 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL**

(TOTAL POINTS AVAILABLE: **45**)

This section has been reviewed and scored by DAVID SMITH

Department name ENGINEERING Signee

Resources

- "Protecting Water Resources with Higher-Density Development," U.S. EPA Development, Community and Environment Division: ***http://www.epa.gov/dced/water_density.htm***
- "Infill Development: Completing the Community Fabric," Municipal Research and Services Center of Washington: ***http://www.mrsc.org/Subjects/Planning/infilldev.aspx***
- Smart Growth Priority Funding Areas Act of 1997, Maryland Department of Planning: ***http://www.mdp.state.md.us/fundingact.htm***
- Metro Regional Government Urban Growth Boundary, Portland Metro: ***http://www.metro-region.org/index.cfm/go/by.web/id/277***
- Smart Growth Toolkit, Smart Growth Leadership Institute: ***http://www.smartgrowthtoolkit.net/main-content/the-smart-growth-implementation-tools.html***
- "Water and Growth: Toward a Stronger Connection Between Water Supply and Land Use in Southeastern Pennsylvania," 10,000 Friends of Pennsylvania: ***http://10000friends.org/water-and-growth***
- "Connecting Smart Growth and Brownfields Redevelopment," Center for Environmental Policy and Management, University of Louisville: ***http://cepm.louisville.edu/publications/PDF_docs/smart%20growth%20and%20brownfields%20for%20website.pdf***
- "Strategies for Successful Infill Development," Northeast Midwest Institute: ***http://www.nemw.org/infillbook.htm***
- "Smart Infill," Greenbelt Alliance: ***http://www.greenbelt.org/resources/reports/smartinfill/index.html***
- Infill Incentives, Policy Link: ***http://www.ci.phoenix.az.us/BUSINESS/infilpgm.html***

Case Studies

- Wisconsin Department of Natural Resources is responsible for helping municipalities establish Sewer Service Area Planning to protect water quality and guide growth within public sewer systems: ***http://dnr.wi.gov/org/water/wm/GLWSP/SSAPlan/***
- Dane County, Wisconsin's BUILD program offers incentives for infill development and removes barriers to redevelopment in order to preserve farmland and prevent greenfield development: ***http://www.countyofdane.com/plandev/Community/build/about.asp***
- U.S. EPA and Land-of-Sky Regional Council in Asheville, North Carolina developed a report outlining market, policy, and regulatory changes that can help overcome the barriers to infill and brownfield redevelopment: ***http://www.epa.gov/dced/pdf/losrc_brownfields.pdf***
- The Oregon Transportation and Growth Management Program prepared a Model Infill Ordinance to clarify legal and policy-related questions about local infill incentives: ***http://www.dca.state.ga.us/intra_nonpub/Toolkit/ModelOrdinances/ModOrdInfl.pdf***
- The City of Sacramento, California's Infill Strategies includes a Water Development Fee Waiver, Reduced Entitlement Fees, and Sewer Facility Fee Reductions: ***http://www.cityofsacramento.org/planning/infill/***
- Phoenix, Arizona's Infill Housing Program provides incentives to encourage single-family housing on vacant and underutilized land and offers high density development standards: ***http://www.ci.phoenix.az.us/BUSINESS/infilpgm.html***
- Portland, Oregon's Infill Design website provides design strategies for integrating infill development into medium-density neighborhoods: ***http://www.portlandonline.com/bps/index.cfm?c=34024***
- Portland, Oregon's Ecoroof Floor Area Ratio (FAR) Bonus allows developers to increase a building's footprint or floor area by adding an ecoroof: ***http://www.portlandonline.com/bes/index.cfm?a=236916&c=48725***
- The Georgia Quality Growth Partnership's Infill Development Program outlines a comprehensive infill strategy that includes incentives, improvements to public facilities, streamlined regulations, and guidelines for the design, density, and location of infill projects: ***http://www.georgiaqualitygrowth.com/ToolDetail.asp?GetTool=32***
- Santa Cruz, California's Accessory Dwelling Unit Development Program encourages well-designed rental housing in the developed core of the City while being careful to discourage poorly-constructed illegal residential additions: ***http://www.ci.santa-cruz.ca.us/pl/hcd/ADU/adu.html***
- Clark County, Washington's Infill Development Incentives include a waiver of all stormwater requirements for infill projects that create less than 5,000 square feet of new impervious surface: ***http://www.clark.wa.gov/commdev/documents/devservices/handouts/46-infill.pdf***
- San Diego, California offers expedited permitting for eligible affordable/infill housing projects: ***http://www.sandiego.gov/development-services/industry/pdf/infobulletin/ib538.pdf***

3 Design Complete, Smart Streets That Reduce Overall Imperviousness

3.A Street Design

3.A.1

QUESTION: Do local street design standards and engineering practices encourage streets to be no wider than necessary to move traffic effectively?

Do street designs vary according to:

- **street type** (arterial streets, collector streets, neighborhood streets) and
- **urban context** (urban core, transit station area, suburban center, general suburban, rural)?

Do policies allow narrow neighborhood streets designed to slow traffic and create safer conditions for pedestrians and bicyclists?

GOAL: Appropriate street widths allow narrower lanes for certain street types, thereby reducing overall imperviousness.

WHY: The width of travel lanes, parking lanes and sidewalks should be tailored to the urban setting. Where appropriate, narrowing travel lane width to 10-11 feet, rather than the standard 12-13 feet, can significantly reduce the total amount of impervious surfaces. Such streets can also substantially improve conditions for walking, biking, and using transit, which reduces automobile use and overall demand for parking spaces.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Comprehensive plan/transportation plan emphasizes alternative modes of transportation (walking, biking, and transit) to reduce vehicle miles traveled and width and prominence of roads/streets.	1	1	
Comprehensive/transportation plan calls for distributing traffic across several parallel streets, reducing the need for high capacity streets with wide rights-of-way.	1	1	
Comprehensive/transportation planning process brings emergency response and other local government departments (e.g., public works, utilities) to the table early in the process to discuss street design.	1	0	
Adopt formal bicycle/pedestrian master plan.	1	1	
Create "safe routes to school" programs or other pedestrian/bike safety initiatives.	1	0	
Make consistent improvements to walking/biking conditions or develop a formal bicycle/pedestrian master plan.	1	1	
REMOVE BARRIERS:			
Comprehensive plan endorses context-sensitive street design with narrower streets in appropriate locations.	1	1	
Improve pedestrian crossing at intersections to encourage walking.	1	1	
Consolidate utilities in street right-of-way to improve sidewalk design and function.	1	0	
		6 PAGE TOTAL	◄ CARRY THIS SUBTOTAL TO NEXT PAGE = 6

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Negotiate with state department of transportation or county transportation department to allow different design standards for regional roads passing through downtowns or other key areas.	1	0	
Promote street standards for fire safety that include attributes of narrow streets (20 feet widths) while identifying factors relevant to local government departments involved with streets such as public works, engineering, and utilities.	2	2	
Take formal control of state or county roads within city boundaries to ensure power over design and operations.	2	0	
ADOPT INCENTIVES:			
Developments that provide comprehensive pedestrian/bicycle circulation systems allowed reducing number of vehicle parking spaces. (See parking section below for greater detail.)	1	0	
Developments with approved comprehensive mobility/transportation plans allowed building narrower, less costly streets and alleys.	1	0	
ENACT REGULATIONS:			
Revamp local government technical street specifications to allow context-sensitive, innovative street design with narrower travel lanes, without curb and gutter, etc., in appropriate circumstances (See Institute of Transportation Engineers Recommended Practice document below).	2	2	
Emergency response professionals and other local government departments involved with streets (e.g. public works, engineering, utilities) have endorsed or adopted design standards for narrower neighborhood streets	1	1	
Development review process involves emergency response early on to reach consensus on appropriate project street design and access.	1	1	
Development review process requires submittal of project pedestrian/bicycle circulation plans with safe street routes and other pedestrian/bicycle-friendly features in addition to traffic circulation plans for larger developments.	1	1	
Apply formal connectivity index[7] or other measures to ensure adequate internal street and pedestrian/bicycle connections.	2	2	
Zoning/subdivision regulations require minimum number of connections between new project and surrounding developments and neighborhoods.	2	2	
		11 PAGE TOTAL	SUBTOTAL FROM PREVIOUS PAGE + 6 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 17

[7] Connectivity index refers to the directness of links and the density of connections in path or road network. A well-connected road or path network has many short links, numerous intersections, and minimal dead-ends (cul-de-sacs). As connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations, and creating a more *Accessible* and *Resilient* system. Source: Online Travel Demand Management Encyclopedia, *http://www.vtpi.org/tdm/tdm116.htm*

3.A.2	
	QUESTION: Are shared driveways, reduced driveway widths, two-track driveways, and rear garages and alleys encouraged for all single-family developments?
	GOAL: Encourage alternative forms and decreased dimensions of residential driveways and parking areas.
	WHY: Off-street parking and driveways contribute significantly to the impervious areas on a residential lot. Reducing such dimensions can minimize the amount of stormwater runoff from a site.

REMOVE BARRIERS:		
Allow developments that utilize shared driveways and rear-loaded garages to permit overnight parking in driveways and on-street.	1	0
Development code prohibits homeowner covenants forbidding overnight parking in driveways, on-street overnight parking, and shared driveways.	1	0
ADOPT INCENTIVES:		
Allow developments with narrow driveways and rear-loaded garages to reduce number of parking spaces for guests.	1	0
Zoning/subdivision regulations require minimum number of connections between new project and surrounding developments and neighborhoods.	1	1
ENACT REGULATIONS:		
Shared driveways are permitted or required for single-family residential developments.	1	0
Minimum widths for single-family driveways reduced to 9 feet.	1	0
Two-track driveways are allowed by technical street/subdivision specifications.	1	0
Single-family residential developments encouraged/required to be designed with minimum percentage of alley-accessible, rear-loading garages. · Alleys/garages encouraged = 1 points · Alleys/garages required = 2 points	1 to 2	0

1 PAGE TOTAL	+	17 SUBTOTAL FROM PREVIOUS PAGE	=	18 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

Green Infrastructure Elements and Street Design

QUESTION: Are major street projects required to integrate green infrastructure practices as a standard part of construction, maintenance, and improvement plans?

GOAL: Formally integrate green infrastructure into standard roadway construction and retrofit practice.

WHY: Consistent projects to improve or repair streets provide opportunities to include green infrastructure retrofits as part of larger project budget, design, and construction.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Comprehensive/transportation plans promote green infrastructure practices in street design.	1	0	
Street project cost estimates include green infrastructure designs and assess cost savings from reduced hard infrastructure.	1	0	
REMOVE BARRIERS:			
Technical street specifications allow/require integration of green infrastructure elements into street project construction.	1	0	
Allow street-side swales to replace conventional curb and gutter for managing stormwater and for separating sidewalks from street traffic in appropriate circumstances.	1	1	
ADOPT INCENTIVES:			
Undertake consistent effort to secure state and federal funds (e.g., transportation enhancements) to pay for green infrastructure elements.	1	0	
Streets with green infrastructure count towards stormwater requirements.	1	1	
ENACT REGULATIONS:			
Adopt green infrastructure retrofit standards for major street projects.	1	0	
Adopt technical specifications and design templates for green infrastructure in private and public rights-of-way.	1	0	
All local road projects required to allocate a minimum amount of the total project cost to green infrastructure elements.	1	0	

2 PAGE TOTAL + 18 SUBTOTAL FROM PREVIOUS PAGE = 20 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

QUESTION: Do regulations and policies promote use of pervious materials for all paving areas, including alleys, streets, sidewalks, crosswalks, driveways, and parking lots?

GOAL: Build and retrofit these surfaces with pervious materials to reduce stormwater runoff and its negative impacts.

NOTE: While eliminating sidewalks or placing sidewalks on only one side of the road can reduce impervious cover, this strategy is typically most appropriate for rural areas. However, other effective strategies can achieve the same runoff reductions that will not limit residents' options for recreation and transportation.

WHY: Streets, sidewalks, and other hard surfaces contribute a large portion to a municipality's total imperviousness. Making these impervious surfaces more permeable protects water quality, reduces flooding, and can recharge groundwater.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Sponsor/approve pilot programs to determine appropriate pervious materials for different paving areas (e.g., permeable concrete for sidewalks, permeable pavers for driveways), as well as process for installation and maintenance.	1	0	
Pilot project results incorporated into standard practice for all new paved areas and retrofits of existing paved surfaces.	1	0	
Adopt policy to replace impervious materials with pervious materials where practical.	1	0	
REMOVE BARRIERS:			
Technical street specifications allow pervious paving materials in appropriate circumstances (e.g., not allowed over aquifer recharge areas).	1	0	
ADOPT INCENTIVES:			
Create formal program offering incentives (e.g., cost sharing, reduction in street widths/parking requirements, assistance with maintenance) to property owners who utilize pervious pavement elements.	1	0	
ENACT REGULATIONS:			
Adopt requirement that some percentage of parking lots, alleys, or roads in a development utilize pervious materials.	1	1	
Development approvals that allow/require use of pervious materials include requirements for continuing maintenance/cleaning of pervious surfaces.	1	1	

PAGE TOTAL: 2

SUBTOTAL FROM PREVIOUS PAGE: 20

▼ **Total score for SECTION 3: DESIGN COMPLETE, SMART STREETS THAT REDUCE OVERALL IMPERVIOUSNESS**: 22 (TOTAL POINTS AVAILABLE: 50)

This section has been reviewed and scored by DAVID SMITH

Department name ENGINEERING Signee

Resources

- Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, Institute of Transportation Engineers: ***http://www.ite.org/css/*** (Ch. 6, pages. 65-87)
- "Neighborhood Street Design Guidelines: An Oregon Guide for Reducing Street Widths," Oregon Department of Transportation and Department of Land Conservation and Development: ***http://www.oregon.gov/LCD/docs/publications/neighstreet.pdf***
- University of California, Davis Sustainable Transportation Center Sustainable Streets Project: ***http://stc.ucdavis.edu/outreach/ssp.php***
- New York High Performance Infrastructure Guidelines: ***http://www.designtrust.org/pubs/05_HPIG.pdf***
- Stormwater Guidelines for Green, Dense Redevelopment: Stormwater Quality Solutions for the City of Emeryville: ***http://www.ci.emeryville.ca.us/planning/pdf/stormwater_guidelines.pdf***
- "Sustainable Green Streets and Parking Lots Design Guidebook," San Mateo County, California Water Pollution Prevention Program: ***http://www.flowstobay.org/ms_sustainable_streets.php***
- Green Streets: Innovative Solutions for Stormwater and Stream Crossings, Portland Metro: ***http://www.oregonmetro.gov/index.cfm/go/by.web/id=26335***
- Green Highways Partnership between U.S. EPA, U.S. Federal Highway Administration and Maryland State Highway Administration: ***http://www.greenhighways.org/***
- Protecting Water Quality with Smart Growth Strategies and Natural Stormwater Management in Sussex County, Delaware: ***http://www.epa.gov/smartgrowth/pdf/2009_0106_sussex_county.pdf***
- Promoting Sustainable Transportation Through Site Design: An Institute of Transportation Engineers Proposed Recommended Practice: ***http://www.cite7.org/Technical_Projects/Final%20Proposed%20Recommended%20Practice%20RP-035.pdf***
- Transportation is about Places, Project for Public Spaces: ***http://www.pps.org/transportation/***

Case Studies

- The Road Ecology Center at the University of California, Davis conducts research and develops policies to design transportation systems that minimize the impacts of roads on landscapes and communities: ***http://roadecology.ucdavis.edu/***
- Houston, Texas's Urban Corridor Planning changes development regulations and infrastructure standards to support transit ridership and walkability in key corridors: ***http://www.houstontx.gov/planning/Urban/urban_cor.html***
- San Francisco, California's Better Streets Plan created a common set of standards and guidelines for designing, building and maintaining more pedestrian friendly sidewalks, crosswalks, and roadways, including extensive greening: ***http://www.sfbetterstreets.org***
- Portland, Oregon's Green Streets Program includes design specifications for swales, planters and curb extensions, creative funding for projects that treat runoff from public rights-of-way, case studies, tours, and videos of public and private green street projects: ***http://www.portlandonline.com/BES/index.cfm?c=44407***
- Seattle, Washington's Right-of-Way Improvements Manual outlines the requirements and permitting process for right-of-way improvements, as well as provides specific design criteria and model templates for submitting street design concepts: ***http://www.seattle.gov/transportation/rowmanual/***
- Florida Department of Transportation developed Model Regulations and Plan Amendments for Multimodal Transportation Districts, including regulation changes related to traffic calming, parking, sidewalks and pedestrian and bicycle facilities, and incentives for developments located in multimodal transportation districts: ***http://www.dot.state.fl.us/planning/systems/sm/los/pdfs/MMTDregs.pdf***
- New York Department of Transportation's Sustainable Streets Strategic Plan includes an initiative to retrofit underused roads into public plazas, streamlining design review for capital projects, and goals to connect tree pits for better surface drainage, among other stormwater management improvements: ***http://www.nyc.gov/html/dot/html/about/stratplan.shtml***
- Chicago, Illinois's Green Alley Program retrofits existing alleys with permeable pavement for better stormwater management, localized flood mitigation, heat reduction, material recycling, and energy conservation: ***http://egov.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/GreenAlleyHandbook.pdf***

- North Carolina Department of Environment and Natural Resources offers guidance to developers on eliminating curbs and gutters, including siting and design considerations, maintenance concerns, effectiveness and cost considerations: ***http://www.p2pays.org/ref/41/40403.pdf***
- New York City requires street trees for every 25 feet of street frontage of a zoning lot: ***http://www.nyc.gov/html/dcp/pdf/street_tree_planting/tree_adopted_cc_043008.pdf***, page 8.
- Seattle Public Utilities' Natural Drainage System projects redesign residential streets to include vegetated drainage systems that use swales, wetlands, trees and other natural features to treat pollutants and minimize the speed and volume of road runoff: ***http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/***

4 Encourage Efficient Parking

4.A Reduced Parking Requirements

4.A.1

QUESTION: Does your local government provide flexibility regarding alternative parking requirements (e.g., shared parking, off-site parking) and discourage over-parking of developments?

Do parking requirements vary by zone to reflect places where more trips are on foot or by transit?

GOAL: Match parking requirements to the level of demand and allow flexible arrangements to meet parking standards.

WHY: Inflexible parking requirements that do not allow for alternative approaches, as well as standards that require too much parking for specific uses increase the amount of impervious surface in a development. Over-parking a development also encourages greater vehicle use and detracts from the overall pedestrian environment.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
The comprehensive plan recognizes the advantages to reduced parking requirements generally and specifically for mixed-use and transit-oriented developments.	1	1	
The comprehensive plan recommends alternative, flexible approaches to meeting parking demands (e.g., shared parking, counting on-street spaces towards site parking requirements).	1	1	
Comprehensive/bicycle plans recommend provision of bicycle parking spaces/storage lockers and concomitant reduction in vehicle parking space requirements.	1	1	
REMOVE BARRIERS:			
Allow flexibility in meeting parking space requirements through shared parking, off-site parking, and similar approaches.	1	1	
Permit businesses with different peak demand periods to share their required parking spaces.	1	1	
ADOPT INCENTIVES:			
Permit reduction in vehicle parking spaces through the provision of a minimum number of bicycle parking spaces.	1	1	
Allow by-right reduction in required parking spaces (e.g., 25%) in mixed-use and transit-oriented developments and districts.	1	0	
Permit developers to undertake parking studies to establish that specific developments (e.g., senior housing, affordable housing) require fewer parking spaces than typical projects.	1	0	

6 PAGE TOTAL ◀ CARRY THIS SUBTOTAL TO NEXT PAGE = 6

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Create parking districts to finance/construct centralized parking lots/ structures as shared parking facilities to reduce on-site parking.	1	0	
ENACT REGULATIONS:			
Revise parking regulations to reduce minimums below standard ITE (Institute of Transportation Engineers) requirements based on analysis of local developments and actual parking demand/experience.	2	0	
Charge developers for every space beyond parking minimums to offset environmental impacts.	1	0	
Enact parking standards that allow credit for adjacent on-street parking.	1	1	
Create zones with reduced parking requirements (e.g., transit overlay districts, mixed-use activity centers, multi-modal districts).	1	0	
Waive all parking minimums in downtown and other locations that are pedestrian-oriented and/or have good transit access.	1	0	
Adopt parking standards that reduce requirements based on sliding scale tied to degree of walkability/transit access locations (20% reduction in areas well served by bus, 30% reduction in areas served by rail stations).	1	0	
Require shared parking agreements where appropriate complementary uses exist.	1	0	
Adopt maximum parking caps (e.g., 125% above minimum) for multi-family and commercial developments.	2	2	
Reduce minimum parking space size based on analysis of average vehicle size in jurisdiction.	1	0	
		3 PAGE TOTAL	SUBTOTAL FROM PREVIOUS PAGE + 6 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 9

4.B Transportation Demand Management Alternatives

4.B.1

QUESTION: Can developers use alternative measures such as transportation demand management or in-lieu payments to reduce required parking?

GOAL: Provide flexibility to reduce parking in exchange for specific actions that reduce parking demands on site.

WHY: Incentives such as transit passes, vanpool arrangements, flexible work schedules, market-priced facilities, and separate leasing for spaces in apartments and condominiums have quantifiable impacts on parking demand. Incorporating them into parking requirements creates the opportunity to meet demand with less impervious cover.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Comprehensive/transportation plans recognize transportation demand management as an approach to reducing vehicle miles traveled and parking requirements.	1	0	
REMOVE BARRIERS:			
Rather than include parking spaces with an apartment lease, allow tenants to opt-out by treating parking as a separate optional lease agreement.	1	0	
ADOPT INCENTIVES:			
Allow businesses that offer employee transit passes, provide vans for employee commuting, allow flexible working arrangements, or charge market rates for parking to 1) provide fewer parking spaces or 2) pay less into a parking district fund for required parking spaces.	2	0	
Allow developers to make in-lieu fee payments for parking. Fees utilized by local government/parking authority to provide off-site parking lots/structures.	1	0	
Provide mechanisms for car sharing in transit-oriented development. Where done, area parking requirements are reduced.	1	0	
ENACT REGULATIONS:			
Create a parking district and allow/require businesses to support public garages rather than provide their own on-site parking.	1	0	
Require large developments to adopt transportation demand management techniques to lower vehicle use and parking demand.	1	0	

PAGE TOTAL 0 + SUBTOTAL FROM PREVIOUS PAGE 9 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 9

4.C Minimize Stormwater From Parking Lots

4.C.1

QUESTION: Are there requirements for landscaping designed to minimize stormwater in parking lots?

GOAL: Require substantial landscaping to help reduce runoff.

WHY: Parking lots generate a large amount of impervious cover. Requiring landscaping reduces the environmental impact of parking and can provide additional community benefits by providing shade and, if appropriately placed, creating natural barriers between pedestrians and cars.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Comprehensive plan calls for landscaping in parking lots to help reduce stormwater runoff.	1	1	
REMOVE BARRIERS:			
Allow alternative or innovative landscaping solutions that provide stormwater management functions to count towards perimeter or other landscaping requirements.	1	1	
ADOPT INCENTIVES:			
Parking lot landscaping and green roofs on parking structures credited towards meeting local stormwater management requirements.	1	1	
Give additional landscaping credit for preservation of large, mature trees within parking lots.	1	1	
Do not count parking structures with green roofs against the allowable floor area ratio of a site.	1	0	
ENACT REGULATIONS:			
Adopt parking lot landscape regulations that require provision of trees, minimum percent of parking lot interior area to be landscaped (e.g., 10%), and minimum sized landscaping areas (e.g., minimum of 25 square feet for island planting areas).	1	1	
In parking lot landscaping regulations, specify the types and sizes of shrubs and trees most appropriate for controlling/reducing stormwater runoff.	1	1	
Adopt standards requiring a minimum area of the parking lot to drain into landscaped areas.	1	0	
Require the management of runoff from parking lots through green infrastructure practices, including trees, vegetated islands, swales, rain gardens, or other approaches.	1	0	

PAGE TOTAL	+ SUBTOTAL FROM PREVIOUS PAGE	= ▼ CARRY THIS SUBTOTAL TO NEXT PAGE
6	9	15

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Enact specific alternative landscaping and parking regulations to support infill development (parking requirements, parking lot landscaping options that focus on perimeter landscaping to encourage smaller lots, etc.).	2	0	
Require parking structures to incorporate green roofs to reduce stormwater runoff.	1	0	
Reduce drive aisle widths in parking lots to decrease the amount of pervious surface. For multi-family developments, drive aisles can be shared. In commercial developments, typical drive aisles can be reduced 5–10%.	1	0	

0 PAGE TOTAL + 15 SUBTOTAL FROM PREVIOUS PAGE = 15 ▼ **Total score for SECTION 4: ENCOURAGE EFFICIENT PARKING** (TOTAL POINTS AVAILABLE: 41)

This section has been reviewed and scored by David Smith

Department name Engineering Signee

Resources

- "Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions" (pg. 14, 18-19, 21), U.S. EPA Development, Community and Environment Division: ***http://www.epa.gov/piedpage/pdf/EPAParkingSpaces06.pdf***
- "Shared Parking, Second Edition," Urban Land Institute: ***www.uli.org/bookstore/***
- "Developing Parking Policies to Support Smart Growth in Local Jurisdictions: Best Practices," Metropolitan Transportation Commission: ***http://www.mtc.ca.gov/planning/smart_growth/parking_study/April07/bestpractice_042307.pdf***
- "Driving Urban Environments: Smart Growth Parking Best Practices," Maryland Governor's Office of Smart Growth: ***http://www.smartgrowth.state.md.us/pdf/Final%20Parking%20Paper.pdf***
- "Design Principles for Parking Lots," Tennessee Valley Authority Economic Development: ***http://www.tvaed.com/sustainable/parking.htm***
- Efficient Parking Strategies, Centralina Council of Governments and Catawba Regional Council of Governments: ***http://www.epa.gov/region4/airqualitytoolkit/9_CaseStudies/SEQL%20-%20Efficient%20Parking%20Strategies.pdf***
- "Parking Management: Strategies, Evaluation and Planning," Victoria Transport Policy Institute: ***http://www.vtpi.org/park_man.pdf***
- "Smart Growth Alternatives to Minimum Parking Requirements," *Proceedings from the 2nd Urban Street Symposium*, July 28-30, 2003: ***http://transtoolkit.mapc.org/Parking/Referenced_pdfs/Forinash_SmartGrowthParkingAlternatives.pdf***
- "Flexible Parking Standards," Georgia Quality Growth Partnership: ***http://www.dca.state.ga.us/toolkit/ToolDetail.asp?GetTool=17***
- "Multifunctional Landscaping: Putting Your Parking Lot Design Requirements to Work for Water Quality," University of Illinois Extension: ***http://urbanext.illinois.edu/lcr/LGIEN2002-0017.html***
- "Low-Impact Parking Lot Design Reduces Runoff and Pollutant Loads," Journal of Water Resources Planning and Management, 2001: ***http://cedb.asce.org/cgi/WWWdisplay.cgi?0101775***
- "Managing Stormwater for Urban Sustainability Using Trees and Structural Soils," Virginia Polytechnic Institute and State University: ***http://www.cnr.vt.edu/urbanforestry/stormwater/Resources/TreesAndStructuralSoilsManual.pdf***

Case Studies

- San Mateo County, California's "Sustainable Green Streets and Parking Lots Design Guidebook" provides policy guidance and design and construction details, including site layout strategies, green infrastructure design guidelines and case studies for both streets and parking lots: ***http://www.flowstobay.org/ms_sustainable_streets.php***
- Minneapolis, Minnesota's zoning code includes regulations to support pedestrian-oriented off-street parking, including parking maximums, shared parking allowances, pedestrian-overlay districts with reduced parking requirements, replacing off-street parking spaces with bicycle racks, and more: ***http://www.ci.minneapolis.mn.us/lrtrezoning/tod-haiwatha-09.asp***
- Boston Metropolitan Area Planning Council gives detailed guidance for reducing parking demand and developing parking requirements based on local factors such as access to transit, expected demographics, auto ownership rates and access to destinations and transit service: ***http://transtoolkit.mapc.org/Parking/Strategies/flexiblerequirements.htm***
- San Diego, California's Community Parking District Program helps older commercial districts collect revenue and implement parking plans to construct public parking facilities, make public transit enhancements, and maximize off-street parking inventory: ***http://www.sandiego.gov/economic-development/business-assistance/small-business/pmd.shtml***
- Placer County, California enacted an In-Lieu Parking Fee that allows developments within specific parking districts to pay a fee in lieu of complying with off-street parking standards. The collected fees are then used to construct new public parking spaces within the same parking district: ***http://www.placer.ca.gov/Departments/Works/TahPkngStudy/DraftParkingFeeOrdinance.aspx***
- Minnesota's Urban Small Sites Best Management Practice Manual provides drawings, design guidelines and plant lists for impervious surface reduction in parking lot design: ***http://km.fao.org/uploads/media/Impervious_surface_reduction_parking_lot_desing.pdf***
- The retrofit of Our Lady Gate of Heaven Parish parking lot in Chicago, Illinois included a large swale that absorbs 100,000 gallons of runoff per year, reducing flooding in the parking lot and in nearby streets and properties. This U.S. EPA-funded project continues to be monitored for

performance data: ***http://www.cnt.org/natural-resources/demonstration-projects/olgh-case-study***

- The Florida Aquarium Parking Lot and Queuing Garden in Tampa, Florida maximizes existing site vegetation for stormwater management and provides education to Aquarium visitors. This website includes construction cost information, lessons learned, monitoring results and maintenance protocols: ***http://www.sustainablesites.org/cases/show.php?id=16***
- Several parking lot demonstration sites in Blacksburg, VA, Ithaca, NY and Davis, CA provide details about newly constructed parking lots and retrofitted lots that include trees, structural soils and pervious pavements for managing stormwater: ***http://www.cnr.vt.edu/urbanforestry/stormwater/DemonstrationSites.html***

5 Adopt Green Infrastructure Stormwater Management Provisions

5.A Green Infrastructure Practices

5.A.1

QUESTION: Are green infrastructure practices encouraged as legal and preferred for managing stormwater runoff?

GOAL: Make all types of green infrastructure allowed and legal and remove all impediments to using green infrastructure (including for stormwater requirements), such as limits on infiltration in rights-of-way, permit challenges for green roofs, safety issues with permeable pavements, restrictions on the use of cisterns and rain barrels, and other such unnecessary barriers.

WHY: Green infrastructure approaches are more effective and cost efficient than conventional stormwater management practices in many instances, and provide other substantial community benefits.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Inform the public, through education and outreach programs, that green infrastructure practices can manage stormwater runoff on their property.	1	1	
Create a green infrastructure workshop or training program for internal and external reviewers to ensure that the stakeholders who use this tool will have the ability to understand and use it effectively.	1	0	
REMOVE BARRIERS:			
Development and other codes encourage and allow property owners to adopt home-based green infrastructure practices, such as rain gardens, rain barrels, and other rainwater harvesting practices.	1	1	
Review and change, where necessary, building codes or other local regulations to ensure that all local government departments/agencies have coordinated with one another to ensure that green infrastructure implementation is legal, e.g. remove restrictions on downspout disconnection.	1	1	
ADOPT INCENTIVES:			
Credit green infrastructure practices towards required controls for stormwater runoff.	1	0	
Establish a "Green Tape" expedited review program for applications that include green infrastructure practices.	1	0	
Reduce stormwater utility rates based on the use of green infrastructure practices.	1	1	
		4.9 PAGE TOTAL	◀ CARRY THIS SUBTOTAL TO NEXT PAGE = 04

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ENACT REGULATIONS:			
Zoning and subdivision regulations specifically permit green infrastructure facilities, including but not limited to: (1 point for each technique to a maximum of 4 points) · Green roofs; · Infiltration approaches, such as rain gardens, curb extensions, planter gardens, permeable and porous pavements, and other designs where the intent is to capture and manage stormwater using soils and plants; · Water harvesting devices, such as rain barrels and cisterns; and · Downspout disconnection.	1 to 4	4	
Developers are required to meet stormwater requirements using green infrastructure practices where site conditions allow. Developers must provide documentation for sites that do not allow on-site infiltration, reuse, or evapotranspiration to meet locally determined performance stormwater management standards.	1 to 2	0	

4 PAGE TOTAL + 4 SUBTOTAL FROM PREVIOUS PAGE = 8 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

5.A.2

QUESTION: Do stormwater management plan reviews take place early in the development review process?

GOAL: Incorporate stormwater plan comments and review into the early stages of development review/site plan review and approval, preferably at pre-application meetings with developers.

WHY: Pre-site plan review is an effective tool for discussing with developers alternative approaches for meeting stormwater requirements. This will incorporate green infrastructure techniques into new projects at early design stages, well before construction begins.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Encourage/require a pre-site plan meeting with developers to discuss stormwater management and green infrastructure approaches. · Voluntary = 1 point · Mandatory = 2 points	1 to 2	2	
Include landscape architects in design and review of stormwater management plans.	1	1	
ADOPT INCENTIVES:			
Provide accelerated review of projects where developer attended a pre-application meeting.	1	0	
ENACT REGULATIONS:			
Preliminary stormwater plan review occurs contemporaneously with preliminary site plan review and before any development approvals.	1	1	
Development applications must include preliminary/conceptual stormwater management plans that incorporate green infrastructure elements and describe how stormwater management standards will be met.	1	1	

5 PAGE TOTAL + 8 SUBTOTAL FROM PREVIOUS PAGE = 13 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

5.A.3

QUESTION: Do local building and plumbing codes allow harvested rainwater for exterior uses, such as irrigation, and non-potable interior uses, such as toilet flushing?

GOAL: Ensure that the municipality allows and encourages stormwater reuse for non-potable uses.

WHY: Stormwater reuse is important for dense, urban areas with limited spaces for vegetated green infrastructure practices.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Local government provides information brochures/manual for homeowners describing acceptable rainwater harvesting techniques.	1	1	
REMOVE BARRIERS:			
Local development, building, and plumbing codes updated to allow reuse of stormwater for non-potable purposes.	1	0	
ADOPT INCENTIVES:			
Reduce stormwater management facility requirements for developments employing comprehensive rainwater harvesting.	1	0	
Reduce stormwater utility rates based on the use of harvest and reuse techniques.	1	0	
ENACT REGULATIONS:			
Require developments to adopt rainwater harvesting techniques as elements of stormwater management plans.	1	1	

PAGE TOTAL 2 + SUBTOTAL FROM PREVIOUS PAGE 13 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 15

5.A.4

QUESTION: Are provisions available to meet stormwater requirements in other ways, such as off-site management within the same sewershed or "payment in lieu" of programs, to the extent that on-site alternatives are not technically feasible?

GOAL: Allow off-site management of runoff while still holding developers responsible for meeting stormwater management goals.

WHY: In some cases, it is impracticable or infeasible to treat all or even some of the stormwater runoff on site. In such instances, alternative means should be provided through contribution to off-site mitigation projects or off-site stormwater management facilities (preferably green infrastructure facilities).

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A
For infill and redevelopment areas, off-site green stormwater management plans should be developed in cooperation between local government and landowners/developers. Allowing off-site management of stormwater runoff requires sewershed designation within the local government to ensure that true mitigation is possible and realize the equal stormwater management and water quality benefits through off-site management.	2	0
Retrofit projects that will utilize green infrastructure stormwater management techniques should be identified and prioritized within the sewershed.	1	0
Amend stormwater management regulations and development codes as necessary to allow off-site stormwater management, especially for infill and redevelopment areas.	1	0
Establish system that allows/requires payment-in-lieu fees for off-site stormwater management facilities. Fees should be set sufficiently high as to cover the true cost of off-site management. Consider limitations on amount of off-site management allowed (more for infill areas, less for greenfield sites).	1	0

PAGE TOTAL 0 + SUBTOTAL FROM PREVIOUS PAGE 15 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 15

5.B.1

QUESTION: Does your stormwater ordinance include monitoring, tracking, and maintenance requirements for stormwater management practices?

GOAL: Incorporate monitoring, tracking, and maintenance requirements for stormwater management practices into your municipal stormwater ordinance.

WHY: These measures will help ensure that the successful tracking and monitoring of green infrastructure practices remain in proper working condition to provide the performance required by the stormwater ordinance.

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
ADOPT PLANS/EDUCATE:			
Develop a system to monitor and track stormwater management practices deployed at greenfield and redevelopment sites. Tracking of management practices should begin during the plan review and approval process with a database or geographic information system (GIS). The database should include both public and private projects.	1	0	
Provide model checklist for maintenance protocols for ease of inspection, tracking, and enforcement.	1	/	
Sponsor demonstration projects for green infrastructure management best practices.	1	/	
REMOVE BARRIERS:			
Ensure that proper local agencies have authority to enforce maintenance requirements.	1	/	
ADOPT INCENTIVES:			
Create self-inspection maintenance certification program that allows developers/landowners to train/retain private inspectors to certify compliance with stormwater management plans and long-term maintenance.	1	/	
ENACT REGULATIONS:			
Require long-term maintenance agreements that allow for public inspections of the management practices and account for transfer of responsibility in leases and/or deed transfers.	1	/	
Conduct inspections every 3 to 5 years, prioritizing properties that pose the highest risk to water quality, inspecting at least 20% of approved facilities annually.	1	/	
Develop a plan approval and post-construction verification process to ensure compliance with stormwater standards, including enforceable procedures for bringing noncompliant projects into compliance.	1	/	

PAGE TOTAL 7 + SUBTOTAL FROM PREVIOUS PAGE 15 = ▼ CARRY THIS SUBTOTAL TO NEXT PAGE 22

Implementation Tools and Policies	Pts. Avail.	Pts. Rec. or N/A	Notes and Local References
Inspections of construction sites occur at for at least 25% of permitted projects to ensure proper installation of approved practices.	1	1	
Require conservation/green infrastructure bond/escrow in zoning/subdivision ordinances to ensure installation/maintenance of green infrastructure storm water management facilities.	1	1	

2

PAGE TOTAL

\+ 22 SUBTOTAL FROM PREVIOUS PAGE

= 24 ▼ **Total score for SECTION 5: GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS** (TOTAL POINTS AVAILABLE: 39)

This section has been reviewed and scored by DAVID SMITH

Department name ENGINEERING Signee

Resources

- Green Infrastructure Municipal Handbook, U.S. EPA Green Infrastructure website: ***http://cfpub.epa.gov/npdes/greeninfrastructure/munichandbook.cfm***
- *A Catalyst for Community Land Use Change*, National NEMO Network 2008 Progress Report with local regulations for water quality protection: ***http://nemonet.uconn.edu/about_network/publications/2008_report.htm***
- Public Entity Environmental Management System Resource Center: ***http://peercenter.net/***
- Environmental Management System, U.S. EPA: ***http://epa.gov/ems/***
- "The Economics of Low-Impact Development: A Literature Review," EcoNorthwest: ***http://www.econw.com/reports/ECONorthwest_Low-Impact-Development-Economics-Literature-Review.pdf***
- "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices," U.S. EPA Office of Water: ***http://www.epa.gov/owow/nps/lid/costs07/***
- New York City's PlaNYC for Water: ***http://www.nyc.gov/html/planyc2030/html/plan/water.shtml***
- Puget Sound Partnership Low Impact Deve opment Local Regulation Assistance Project: ***http://www.psparchives.com/our_work/stormwater/lid/lid_regs.htm***
- Massachusetts Low Impact Development Toolkit: ***http://www.mapc.org/regional_planning/LID/PDFs/LID%20Local%20Codes%20Checklist.pdf***
- Plan Review checklist and flow chart, Office of Watersheds, Philadelphia Water Department: ***http://www.phillyriverinfo.org/WICLibrary/DevelopmentProcess_Final.pdf***
- General Factors that Influence the Selection of Stormwater Management Facilities, Portland Bureau of Environmental Services: ***http://www.portlandonline.com/shared/cfm/image.cfm?id=129055***
- Operations and Maintenance of Treatment Best Management Practices, Santa Clara Valley Urban Pollution Prevention Program: ***http://www.scvurppp-w2k.com/om_workproduct_links.htm***
- Stormwater Center Maintenance Agreements Guidance and Case Studies: ***http://www.stormwatercenter.net/Manual_Builder/Maintenance_Manual/4Maintenance_Agreements/Maintenance%20Agreements%20Introduction.htm***

Case Studies

- Alachua County, Florida's stormwater regulation requires that developers reduce impervious surfaces via vertical construction and alternative parking surfaces and use site contours and minimize disturbance to existing natural features: ***http://growth-management.alachua.fl.us/compplanning/amended_docs/ORDstormCPA-06-01final.pdf***
- Philadelphia, Pennsylvania's stormwater regulation requires that projects infiltrate/manage the first 1" of rainfall from all directly connected impervious surfaces and exempts redevelopment projects from flood control and channel protection requirements: ***http://www.phillyriverinfo.org/Programs/SubprogramMain.aspx?Id=Regulations***
- Portland, Oregon's stormwater requirement uses a mandatory hierarchy that requires on-site infiltration with surface vegetation above all other practices ***http://www.portlandonline.com/bes/index.cfm?c=35122*** (Chapter 1, page 1-18)
- Emeryville, California's stormwater guidelines for dense green redevelopment provide guidance on using green infrastructure in high density, infill sites: ***http://ca-emeryville.civicplus.com/DocumentView.asp?DID=144***
- Portland, Oregon's Ecoroof Floor Area Ratio (FAR) Bonus allows developers to increase a building's footprint or floor area for projects that include an ecoroof: ***http://www.portlandonline.com/bes/index.cfm?a=236916&c=48725***
- Chicago Department of Construction and Permits has a Green Permit Program that offers expedited permits and waived permit review fees for projects that meet a series of green building requirements, including exceptional water management and green roof criteria: ***http://egov.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/GreenPermitBrochure1.pdf***
- Tucson, Arizona's Water Harvesting Guidance Manual describes how the City's code requirements for water harvesting help to meet several other local codes, such as for landscaping, floodplain and erosion hazard management, and stormwater management: ***http://dot.tucsonaz.gov/stormwater/education/waterharvest.php*** (page 26)
- San Francisco, California's Public Utilities, Department of Building Inspection and Department of Public Health partnered to allow the use of rainwater for irrigation and toilet flushing without requiring treatment to potable standards: ***http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/361/MTO_ID/559***

- Seattle, Washington's Green Factor is an amended landscape requirement that property owners meet via a scoring system that encourages green features such as large plants, permeable pavement, green roofs, vegetated walls and tree preservation: ***http://www.seattle.gov/dpd/permits/greenfactor/Overview/***
- San Jose, California's stormwater regulation requires that projects with 10,000 square feet or more of impervious surface area use landscape-based treatment and trees to meet quantity and quality standards: ***http://www.sanjoseca.gov/planning/stormwater/Policy_6-29_Memo_Revisions.pdf***
- Santa Monica, California's stormwater code requires that new development projects maximize permeable areas, maximize runoff to permeable areas, reuse stormwater, and reduce parking lot pollution: ***http://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Urban_Runoff/UR_Brochure.pdf***
- Chicago, Illinois's stormwater regulation requires that new developments manage 0.5" runoff from all impervious surfaces or reduce imperviousness by 15%: ***http://egov.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/StormwaterManagementOrdinance1206.pdf***
- Lenexa, Kansas's stormwater regulation requires new developments to manage 1.37" for water quality using a natural system treatment train approach and also charges a fee for water quantity management which pays for watershed-scale public projects managed by the City: ***http://www.ci.lenexa.ks.us/LenexaCode/viewXRef.asp?Index=2927***
- Fauquier County, Virginia's stormwater maintenance agreements state that if maintenance is neglected the County has the authority to perform the work and recover costs from the property owner: ***http://www.fauquiercounty.gov/documents/departments/commdev/pdf/SWMOrdinance.pdf*** (pages 12-13)
- Philadelphia, Pennsylvania's Stormwater Management Guidance Manual provides maintenance guidelines and schedules for a range of green infrastructure practices, from green roofs to pervious pavements and subsurface infiltration: ***http://www.phillyriverinfo.org/Programs/SubprogramMain.aspx?Id=StormwaterManual***

ACKNOWLEDGMENTS

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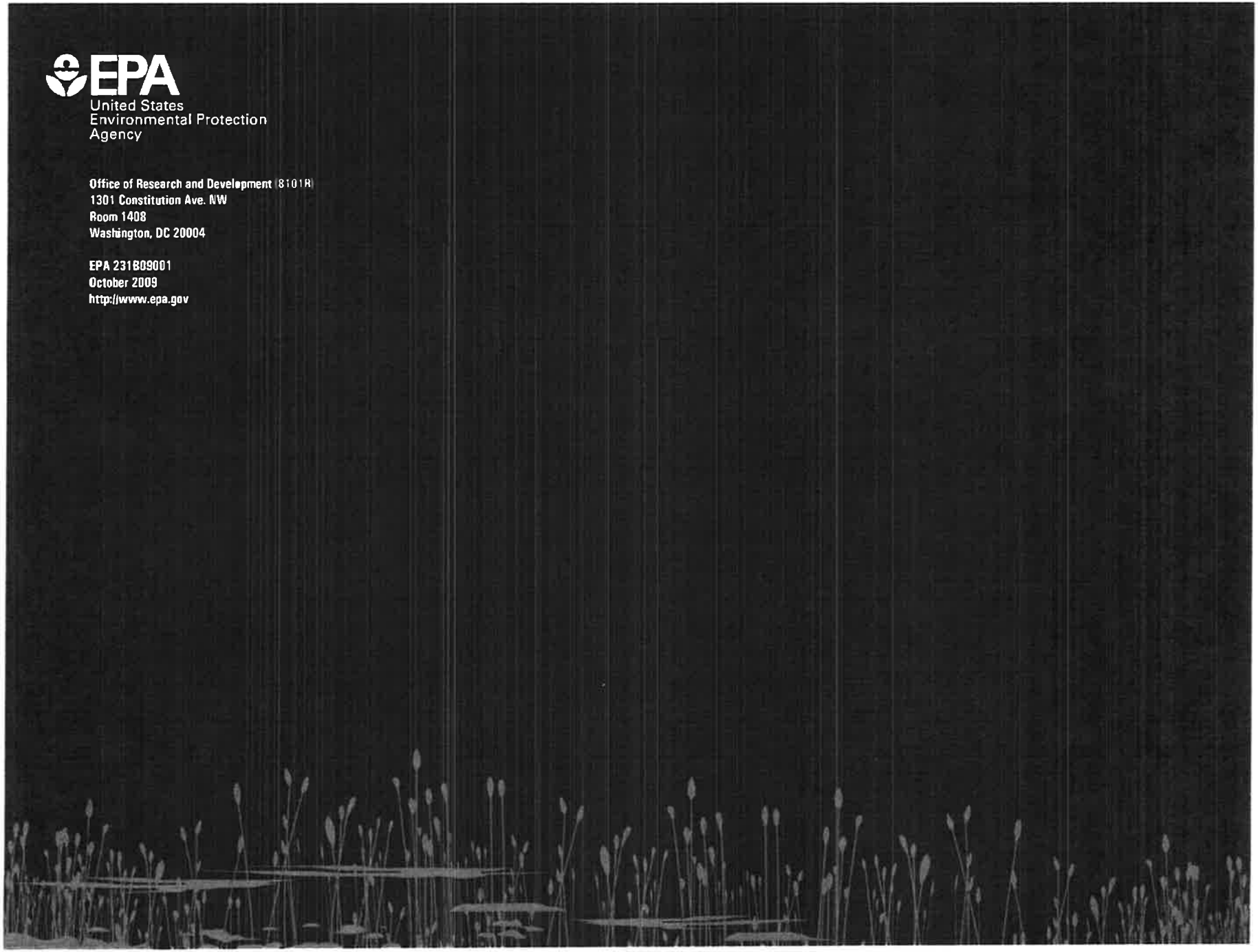

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Attachment #6: Revisions of Codes, Ordinances, and Policies Associated with Permanent Stormwater Management

FILE COPY

ORDINANCE 12-183

AN ORDINANCE AMENDING VARIOUS SECTIONS IN TITLE 18, CHAPTER 6 PERTAINING TO STORM WATER MANAGEMENT AND POLLUTION CONTROL PLAN; PROVIDING FOR AN EFFECTIVE DATE

WHEREAS the City of Lakeland was issued a new Notice of Coverage for Stormwater Discharges from the Tennessee Department of Environment and Conservation (TDEC) on May 6, 2011; and,

WHEREAS the Notice of Coverage specifies that Municipal Separate Storm Sewer Systems (MS4) comply with new stormwater regulations issued by TDEC; and,

WHEREAS the proposed amendments will provide compliance with the Tennessee Department of Environment and Conservation MS4 stormwater regulations.

NOW, THEREFORE BE IT ORDINATED BY THE BOARD OF COMMISSIONERS OF THE CITY OF LAKELAND, TENNESSEE THAT:

Section 1. The following Sections of Title 18, Chapter 6 are hereby amended, deleted or modified.

I. **Section 18-601.**

1. Delete Section 18-601 (1) and add the following new section.

18-601. General Purpose.

(1) Purpose. It is the purpose of this chapter to:

(a) Protect, maintain, and enhance the environment of the city and the public health, safety and the general welfare of the citizens of the city, by controlling discharges of pollutants to the city's stormwater system and to maintain and improve the quality of the receiving waters into which the stormwater outfalls flow, including, without limitation, lakes, rivers, streams, ponds, wetlands, and groundwater of the city;

(b) Enable the city to comply with the National Pollution Discharge Elimination System permit (NPDES) and applicable regulations, 40 CFR 122.26 for stormwater discharges;

(c) Allow the city to exercise the powers granted in Tennessee Code Annotated § 68-221-1105, which provides that, among other powers cities have with respect to stormwater facilities, is the power by ordinance or resolution to:

(i) Exercise general regulation over the planning, location, construction, and operation and maintenance of stormwater facilities in the city, whether or not owned and operated by the city;

(ii) Adopt any rules and regulations deemed necessary to accomplish the purposes of this statute, including the adoption of a system of fees for services and permits;

(iii) Establish standards to regulate the quantity of stormwater discharged and to regulate stormwater contaminants as may be necessary to protect water quality;
(iv) Review and approve plans and plats for stormwater management in proposed subdivisions or commercial developments;
(v) Issue permits for stormwater discharges, or for the construction, alteration, extension, or repair of stormwater facilities;
(vi) Suspend or revoke permits when it is determined that the permittee has violated any applicable ordinance, resolution, or condition of the permit;
(vii) Regulate and prohibit discharges into stormwater facilities of sanitary, industrial, or commercial sewage or waters that have otherwise been contaminated; and
(viii) Expend funds to remediate or mitigate the detrimental effects of contaminated land or other sources of stormwater contamination, whether public or private.

II. Section 18-601

I. Add the following new definitions to Section 18-601(4).

"City Manager" means the Chief Administrator Officer of the City, whose duties are established by Tennessee Statutes and by the Board of Commissioners.

"City" means the City of Lakeland staff, employees, equipment, or contractual resources under the direction and contract with the City.

"Illicit connections" means illegal and/or unauthorized connections to the municipal separate stormwater system whether or not such connections result in discharges into that system.

"Hotspot" means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater. The following land uses and activities are deemed stormwater hot spots, but that term is not limited to only these land uses:
(a) vehicle salvage yards and recycling facilities
(b) vehicle service and maintenance facilities
(c) vehicle and equipment cleaning facilities
(d) fleet storage areas (bus, truck, etc.)
(e) industrial sites (included on Standard Industrial Classification code list)
(f) marinas (service and maintenance)
(g) public works storage areas

(h) facilities that generate or store hazardous waste materials
(i) commercial container nursery
(j) restaurants and food service facilities
(k) other land uses and activities as designated by an appropriate review authority

"Municipal separate storm sewer system (MS4)" means the conveyances owned or operated by the city for the collection and transportation of stormwater, including the roads and streets and their drainage systems, catch basins, curbs, gutters, ditches, man-made channels, and storm drains, and where the context indicates, it means the municipality that owns the separate storm sewer system.

"Stormwater Pollution Prevention Plan (SWPPP)" means a written plan that includes site map(s), an identification of construction/contractor activities that could cause pollutants in the stormwater, and a description of measures or practices to control these pollutants.

"TDEC" means the Tennessee Department of Environment and Conservation.

II. **Section 18-602.**

1. Delete Paragraphs (2),(3) and (4) and insert the following new paragraphs

(2) Prohibition of illicit discharges. No person shall introduce or cause to be introduced into the municipal separate storm sewer system any discharge that is not composed entirely of stormwater or any discharge that flows from stormwater facility that is not inspected in accordance with Section 18-604 shall be an illicit discharge. Non-stormwater discharges shall include, but shall not be limited to, sanitary wastewater, car wash wastewater, radiator flushing disposal, spills from roadway accidents, carpet cleaning wastewater, effluent from septic tanks, improper oil disposal, laundry wastewater/gray water, improper disposal of auto and household toxics. The commencement, conduct or continuance of any non-stormwater discharge to the municipal separate storm sewer system is prohibited except as described as follows:

(i) Water line flushing or other potable water sources;
(ii) Landscape irrigation or lawn watering with potable water;
(iii) Diverted stream flows;
(iv) Rising ground water;
(v) Groundwater infiltration to storm drains;
(vi) Pumped groundwater;
(vii) Foundation or footing
(viii) Crawl space pumps;
(ix) Air conditioning
(x) Springs;

(xi) Non-commercial washing of vehicles;
(xii) Natural riparian habitat or wetland flows;
(xiii) Swimming pools (if dechlorinated - typically less than one PPM chlorine);
(xiv) Firefighting activities;
(xv) Any other uncontaminated water source.

(b) Discharges specified in writing by the city as being necessary to protect public health and safety.

(c) Dye testing is an allowable discharge if the city has so specified in writing.

(d) Discharges authorized by the Construction General Permit (CGP), which comply with Section 3.5.9 of the same:

(i) dewatering of work areas of collected stormwater and ground water (filtering or chemical treatment may be necessary prior to discharge);
(ii) waters used to wash vehicles (of dust and soil, not process materials such as oils, asphalt or concrete) where detergents are not used and detention and/or filtering is provided before the water leaves site;
(iii) water used to control dust in accordance with CGP section 3.5.5;
(iv) potable water sources including waterline flushings from which chlorine has been removed to the maximum extent practicable;
(v) routine external building washdown that does not use detergents or other chemicals;
(vi) uncontaminated groundwater or spring water; and
(vii) foundation or footing drains where flows are not contaminated with pollutants (process materials such as solvents, heavy metals, etc.).

(3) Prohibition of illicit connections. The construction, use, maintenance or continued existence of illicit connections to the municipal separate storm sewer system is prohibited. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(4) Reduction of stormwater pollutants by the use of best management practices. Any person responsible for a property or premises, which is, or may be, the source of an illicit discharge, may be required to implement, at the person's expense, the BMP's necessary to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed in compliance with the provisions of this section. Discharges from existing BMP's that have not been maintained and/or inspected in accordance with this ordinance shall be regarded as illicit.

(5) Notification of spills. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected

release of materials which are resulting in, or may result in, illicit discharges or pollutants discharging into, the municipal separate storm sewer system, the person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials the person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, the person shall notify the city in person or by telephone, fax, or email, no later than the next business day. Notifications in person or by telephone shall be confirmed by written notice addressed and mailed to the city within three (3) business days of the telephone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three (3) years.

III. Section 18-603.

1. Delete Section 18-603(1) in its entirety and insert the following new language.

18-603 Land Development and Construction Activity.

(1) This section shall be applicable to all land development, including, but not limited to, site plan applications, subdivision applications, land disturbance applications and grading applications. These standards apply to any new development or redevelopment site that meets one or more of the following criteria:

(a) One (1) acre or more;

(i) New development that involves land development activities of one (1) acre or more;

(ii) Redevelopment that involves other land development activity of one (1) acre or more;

(b) Projects or developments of less than one acre of total land disturbance must acquire a land disturbance permit from the City of Lakeland if:

(i) the City of Lakeland has determined that the stormwater discharge from a site is causing, contributing to, or is likely to contribute to a violation of a state water quality standard;

(ii) the City of Lakeland has determined that the stormwater discharge is, or is likely to be a significant contributor of pollutants to waters of the state;

(c) changes in state or federal rules require sites of less than one acre that are not part of a larger common plan of development or sale to obtain a stormwater permit;

(d) Any new development or redevelopment, regardless of size, that is defined by the City of Lakeland to be a hotspot land use; or

(e) Minimum applicability criteria set forth in item (a) above if such activities are part of a larger common plan of development, even multiple, that is part of a separate and distinct land development activity that may take place at different times on different schedules.

(f) Any discharge of stormwater or other fluid to an improved sinkhole or other injection well, as defined, must be authorized by permit or rule as a Class V underground injection well under the provisions of Tennessee Department of Environment and Conservation (TDEC) Rules, Chapter 1200-4-6.

2 Delete Section 18-603(2)(a) and insert the following new paragraphs:

(2) A Stormwater Pollution Prevention Plan (SWPPP) must be prepared and approved by the City of Lakeland and TDEC before construction begins. In order to effectively reduce erosion and sedimentation impacts, Best Management Practices (BMP's) must be designed, installed, and maintained during land disturbing activities. The SWPPP should be prepared in accordance with the current Tennessee Erosion and Sediment Control Handbook. All SWPPP's shall be prepared and updated in accordance with Section 3 of the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activities.

(3) The erosion prevention and sediment control plan component of the SWPPP shall accurately describe the potential for soil erosion and sedimentation problems resulting from land disturbing activity and shall explain and illustrate the measures that are to be taken to control these problems. The length and complexity of the plan is to be commensurate with the size of the project, severity of the site condition, and potential for off-site damage. If necessary, the plan shall be phased so that changes to the site during construction that alter drainage patterns or characteristics will be addressed by an appropriate phase of the plan. The plan shall be sealed by a registered professional engineer or landscape architect licensed in the state of Tennessee. The plan shall also conform to the requirements found in the MS4 BMP manual, and shall include at least the following:

(i) Project description - Briefly describe the intended project and proposed land disturbing activity including number of units and structures to be constructed and infrastructure required.

(ii) A topographic map with contour intervals of five (5) feet or less showing present conditions and proposed contours resulting from land disturbing activity.

(iii) All existing drainage ways, including intermittent and wet-weather. Include any designated floodways or flood plains.

(iv) A general description of existing land cover. A tree management plan shall be submitted as part of the SWWP. Stands of existing trees as they are to be preserved upon project completion, specifying their general location on the property. Differentiation shall be made between existing trees to be preserved, trees to be removed and proposed planted trees. Tree protection measures must be identified, and the diameter of the area involved must also be identified on the plan and shown to scale. Information shall be supplied concerning the proposed destruction of exceptional and historic trees in setbacks and buffer strips, where they exist. Complete landscape plans may be submitted separately. The plan must include the sequence of implementation for tree protection measures.

(v) Approximate limits of proposed clearing, grading and filling.

(vi) Approximate flows of existing stormwater leaving any portion of the site.

(vii) A general description of existing soil types and characteristics and any anticipated soil erosion and sedimentation problems resulting from existing characteristics.

(viii) Location, size and layout of proposed stormwater and sedimentation control improvements.

(ix) Existing and proposed drainage network.

(x) Proposed drain tile or waterway sizes.

(xi) Approximate flows leaving site after construction and incorporating water run-off mitigation measures. The evaluation must include projected effects on property adjoining the site and on existing drainage facilities and systems. The plan must address the adequacy of outfalls from the development: when water is concentrated, what is the capacity of waterways, if any, accepting stormwater off-site; and what measures, including infiltration, sheeting into buffers, etc., are going to be used to prevent the scouring of waterways and drainage areas off-site, etc.

(xii) The projected sequence of work represented by the grading, drainage and sedimentation and erosion control plans as related to other major items of construction, beginning with the initiation of excavation and including the construction of any sediment basins or retention/detention facilities or any other structural BMP's.

(xiii) Specific remediation measures to prevent erosion and sedimentation run-off. Plans shall include detailed drawings of all control measures used; stabilization measures including vegetation and non-vegetation measures, both temporary and permanent, will be detailed. Detailed construction notes and a maintenance schedule shall be included for all control measures in the plan.

(xiv) Specific details for: the construction of stabilized construction entrance/exits, concrete washouts, and sediment basins for controlling erosion; road access points; eliminating or keeping soil, sediment, and debris on streets and public ways at a level acceptable to the city. Soil, sediment, and debris brought onto streets and public ways must be removed by the end of the work day to the satisfaction of the city. Failure to remove the sediment, soil or debris shall be deemed a violation of this ordinance.

(xv) Proposed structures: location and identification of any proposed additional buildings, structures or development on the site.

(xvi) A description of on-site measures to be taken to recharge surface water into the ground water system through runoff reduction practices.

(xvii) Specific details for construction waste management. Construction site operators shall control waste such as discarded building materials, concrete truck washout, petroleum products and petroleum related products, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality. When the material is erodible, such as soil, the site must be treated as a construction site.

ORDINANCE 12-183

AN ORDINANCE AMENDING VARIOUS SECTIONS IN TITLE 18, CHAPTER 6 PERTAINING TO STORM WATER MANAGEMENT AND POLLUTION CONTROL PLAN; PROVIDING FOR AN EFFECTIVE DATE

3. Delete Section 18-603(2)(c) in its entirety and replace it with the following new paragraph..

(4) Permitting Requirements.
Permittees who discharge stormwater through an NPDES-permitted municipal separate storm sewer system (MS4) who are not exempted in section 1.4.of the Construction General Permit (CGP) must provide proof of coverage under the Construction General Permit (CGP); submit a copy of the Stormwater Pollution Prevention Plan (SWPPP); and at project completion, a copy of the signed notice of termination (NOT) to the City of Lakeland Engineering Office.

4. Delete 18-603 (3) and add the following new paragraph 18-603(5)

(5) Landscaping and stabilization requirements.

(a) Any area of land from which the natural vegetative cover has been either partially or wholly cleared by development activities shall be stabilized. Stabilization measures shall be initiated as soon as possible in portions of the site where construction activities have temporarily or permanently ceased. Temporary or permanent soil stabilization at the construction site (or a phase of the project) must be completed not later than 15 days after the construction activity in that portion of the site has temporarily or permanently ceased. In the following situations, temporary stabilization measures are not required:
   (i) where the initiation of stabilization measures is precluded by snow cover or frozen ground conditions or adverse soggy ground conditions, stabilization measures shall be initiated as soon as practicable; or
   (ii) where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 15 days.

(b) Permanent stabilization with perennial vegetation (using native herbaceous and woody plants where practicable) or other permanently stable, non-eroding surface shall replace any temporary measures as soon as practicable. Unpacked gravel containing fines (silt and clay sized particles) or crusher runs will not be considered a non-eroding surface. The

(c) following criteria shall apply to revegetation efforts:
   (i) Reseeding must be done with an annual or perennial cover crop accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until such time as the cover crop is established over ninety percent (90%) of the seeded area.

(ii) Replanting with native woody and herbaceous vegetation must be accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until the plantings are established and are capable of controlling erosion.

(iii) Any area of revegetation must exhibit survival of a minimum of seventy-five percent (75%) of the cover crop throughout the year immediately following revegetation. Revegetation must be repeated in successive years until the minimum seventy-five percent (75%) survival for one (1) year is achieved.

(iv) In addition to the above requirements, a landscaping plan must be submitted with the final design describing the vegetative stabilization and management techniques to be used at a site after construction is completed. This plan will explain not only how the site will be stabilized after construction, but who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved.

IV. Section 18-604.

1. Delete Sections 18-604(1)(2)(3)(4)(5) and insert the following new paragraphs 1 through 10.

18-604. Design and On-site management of stormwater facilities and maintenance agreements.

(1) Maintenance Agreement-Deed Restriction. Where the stormwater facility is located on property that is subject to a development agreement, and the development agreement provides for a permanent stormwater maintenance agreement that runs with the land, the owners of property must execute an inspection and maintenance agreement that shall operate as a deed restriction binding on the current property owners and all subsequent property owners and their lessees and assigns, including but not limited to, homeowner associations or other groups or entities.

(2) Maintenance Agreement Requirements. The maintenance agreement shall:

a) Assign responsibility for the maintenance and repair of the stormwater facility to the owners of the property upon which the facility is located and be recorded as such on the plat for the property by appropriate notation.

b) Provide for a periodic inspection by the property owners in accordance with the requirements of subsections below for the purpose of documenting maintenance and repair needs and to ensure compliance with the requirements of this ordinance. It shall also grant permission to the

city to enter the property at reasonable times and to inspect the stormwater facility to ensure that it is being properly maintained.

c) Provide that the minimum maintenance and repair needs include, but are not limited to: the removal of silt, litter and other debris, the cutting of grass, cutting and vegetation removal, and the replacement of landscape vegetation, in detention and retention basins, and inlets and drainage pipes and any other stormwater facilities. It shall also provide that the property owners shall be responsible for additional maintenance and repair needs consistent with the needs and standards outlined in the MS4 BMP manual.

d) Provide that maintenance needs must be addressed in a timely manner, on a schedule to be determined by the City Manager.

e) Provide that if the property is not maintained or repaired within the prescribed schedule, the City Manager may direct city employees and other resources to perform the maintenance and repair at its expense, and bill the same to the property owner. The maintenance agreement shall also provide that the city's cost of performing the maintenance shall be a lien against the property.

(3) Existing problem locations – no maintenance agreement.

a) The _City Manager shall in writing notify the owners of existing locations and developments of specific drainage, erosion or sediment problems affecting or caused by such locations and developments, and the specific actions required to correct those problems. The notice shall also specify a reasonable time for compliance. Discharges from existing BMP's that have not been maintained and/or inspected in accordance with this ordinance shall be regarded as illicit.

b) Inspection of existing facilities. The city may, to the extent authorized by state and federal law, enter and inspect private property for the purpose of determining if there are illicit non-stormwater discharges, and to establish inspection programs to verify that all stormwater management facilities are functioning within design limits. These inspection programs may be established on any reasonable basis, including but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of the city's NPDES stormwater permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water,

groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other BMP's.

(4) Owner/Operator Inspections - generally. The owners and/or the operators of stormwater management practices shall:

a) Perform routine inspections to ensure that the BMP's are properly functioning. These inspections shall be conducted on an annual basis, at a minimum. These inspections shall be conducted by a person familiar with control measures implemented at a site. Owners or operators shall maintain documentation of these inspections. The City Manager may require submittal of this documentation.

b) Perform comprehensive inspection of all stormwater management facilities and practices. These inspections shall be conducted once every five years, at a minimum. Such inspections must be conducted by either a professional engineer or landscape architect, licensed in the State of Tennessee. Complete inspection reports for these five year inspections shall include:

(i) Facility type,
(ii) Inspection date,
(iii) Latitude and longitude and nearest street address,
(iv) BMP owner information (e.g. name, address, phone number, fax, and email),
(v) A description of BMP condition including: vegetation and soils; inlet and outlet channels and structures; embankments, slopes, and safety benches; spillways, weirs, and other control structures; and any sediment and debris accumulation,
(vi) Photographic documentation of BMP's, and
(vii) Specific maintenance items or violations that need to be corrected by the BMP owner along with deadlines and reinspection dates.

c) Owners or operators shall maintain documentation of these inspections. The _City Manager may require submittal of this documentation.

(5) Requirements for all existing locations and ongoing developments. The following requirements shall apply to all locations and developments at which land disturbing activities have occurred:

a) Denuded areas must be vegetated or covered under the standards and guidelines specified in Section 18-603 and on a schedule acceptable to the City Manager.

b) Cuts and slopes must be properly covered with appropriate vegetation and/or retaining walls constructed.

c) Drainage ways shall be properly covered in vegetation or secured with rip-rap, channel lining, etc., to prevent erosion.

d) Trash, junk, rubbish, etc. shall be cleared from drainage ways.

e) Stormwater runoff shall, at the discretion of the City Manager be controlled to the maximum extent practicable to prevent its pollution. Such control measures may include, but are not limited to, the following:

(i) Ponds
1) Detention pond
2) Extended detention pond
3) Wet pond
4) Alternative storage measures

(ii) Constructed wetlands

(iii) Infiltration systems
1) Infiltration/percolation trench
2) Infiltration basin
3) Drainage (recharge) well
4) Porous pavement

(iv) Filtering systems
1) Catch basin inserts/media filter
2) Sand filter
3) Filter/absorption bed
4) Filter and buffer strips

(v) Open channel
1) Swale

(6) Corrections of problems subject to appeal. Corrective measures imposed by the City under this section are subject to appeal under Section 18-607 of this chapter.

(7) Inspection of stormwater management facilities. Periodic inspections of facilities shall be performed, documented, and reported in accordance with this chapter, as detailed in §14-506.

(8) Records of installation and maintenance activities. Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation of the stormwater facility, and of all maintenance and repairs to the facility, and shall retain the records for at least three (3) years. These records shall be made available to the city during inspection of the facility and at other reasonable times upon request.

(9). Failure to meet or maintain design or maintenance standards. If a responsible party fails or refuses to meet the design or maintenance standards required for stormwater facilities, the city, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper

working condition. In the event that the stormwater management facility becomes a danger to public safety or public health, the city shall notify in writing the party responsible for maintenance of the stormwater management facility. Upon receipt of that notice, the responsible person shall have thirty (30) days to effect maintenance and repair of the facility in an approved manner. In the event that corrective action is not undertaken within that time, the city may take necessary corrective action. The cost of any action by the city under this section shall be charged to the responsible party.

(10). Design of Stormwater Facilities. Minimum design standards for stormwater facilities shall follow the Memphis Shelby County Stormwater Design Manual and the City of Lakeland Subdivision regulations whichever is the more stringent.

V. Section 18-605

1. Delete Section 18-605 in its entirety and replace it with the following

18-605. Enforcement.

(1) Enforcement authority. The City of Lakeland shall have the authority to issue notices of violation and citations, and to impose the civil penalties provided in this section. Measures authorized include:

(a) Verbal Warnings – At a minimum, verbal warnings must specify the nature of the violation and required corrective action.

(b) Written Notices – Written notices must stipulate the nature of the violation and the required corrective action, with deadlines for taking such action.

(c) Citations with Administrative Penalties – The MS4 has the authority to assess monetary penalties, which may include civil and administrative penalties.

(d) Stop Work Orders – Stop work orders that require construction activities to be halted, except for those activities directed at cleaning up, abating discharge, and installing appropriate control measures.

(e) Withholding of Plan Approvals or Other Authorizations – Where a facility is in noncompliance, the MS4's own approval process affecting the facility's ability to discharge to the MS4 can be used to abate the violation.

(f) Additional Measures – The MS4 may also use other escalated measures provided under local legal authorities. The MS4 may perform work necessary to improve erosion control measures and collect the funds from the responsible party in an appropriate manner, such as collecting against

the project's bond or directly billing the responsible party to pay for work and materials.

(2) Notification of violation:

(a) Verbal warning. Verbal warning may be given at the discretion of the inspector when it appears the condition can be corrected by the violator within a reasonable time, which time shall be approved by the inspector. (b) Written notice. Whenever the _City Manager finds that any permittee or any other person discharging stormwater has violated or is violating this ordinance or a permit or order issued hereunder, the City of Lakeland may serve upon such person written notice of the violation. Within ten (10) days of this notice, an explanation of the violation and a plan for the satisfactory correction and prevention thereof, to include specific required actions, shall be submitted to the City Manager. Submission of this plan in no way relieves the discharger of liability for any violations occurring before or after receipt of the notice of violation.

(c) Consent orders. The City of Lakeland is empowered to enter into consent orders, assurances of voluntary compliance, or other similar documents establishing an agreement with the person responsible for the noncompliance. Such orders will include specific action to be taken by the person to correct the noncompliance within a time period also specified by the order. Consent orders shall have the same force and effect as administrative orders issued pursuant to paragraphs (d) and (e) below.

(d) Show cause hearing. The _City Manager may order any person who violates this chapter or permit or order issued hereunder, to show cause why a proposed enforcement action should not be taken. Notice shall be served on the person specifying the time and place for the meeting, the proposed enforcement action and the reasons for such action, and a request that the violator show cause why this proposed enforcement action should not be taken. The notice of the meeting shall be served personally or by registered or certified mail (return receipt requested) at least ten (10) days prior to the hearing.

(e) Compliance order. When the _City Manager finds that any person has violated or continues to violate this chapter or a permit or order issued thereunder, he may issue an order to the violator directing that, following a specific time period, adequate structures or devices be installed and/or procedures implemented and properly operated. Orders may also contain such other requirements as might be reasonably necessary and appropriate to address the noncompliance, including the construction of appropriate structures, installation of devices, self-monitoring, and management practices.

(f) Cease and desist and stop work orders. When the _City Manager finds that any person has violated or continues to violate this chapter or any permit or order issued hereunder, the _City Manager may issue a stop work order or an order to cease and desist all such violations and direct those persons in noncompliance to:

(i) Comply forthwith; or

(ii) Take such appropriate remedial or preventive action as may be needed to properly address a continuing or threatened violation; including halting operations except for terminating the discharge and installing appropriate control measures.

(g) Suspension, revocation or modification of permit. The City of Lakeland may suspend, revoke or modify the permit authorizing the land development project or any other project of the applicant or other responsible person within the city. A suspended, revoked or modified permit may be reinstated after the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein, provided such permit may be reinstated upon such conditions as the City of Lakeland may deem necessary to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.

(h) Conflicting standards. Whenever there is a conflict between any standard contained in this chapter and in the BMP manual adopted by the city under this ordinance, the strictest standard shall prevail.

VI. Section 18-606

1. Add the following new Section.

18-606. Penalties.

(1) Violations. Any person who shall commit any act declared unlawful under this chapter, who violates any provision of this chapter, who violates the provisions of any permit issued pursuant to this chapter, or who fails or refuses to comply with any lawful communication or notice to abate or take corrective action by the City of Lakeland, shall be guilty of a civil offense.

(2) Penalties. Under the authority provided in Tennessee Code Annotated § 68-221-1106, the city declares that any person violating the provisions of this chapter may be assessed a civil penalty by the City of Lakeland of not less than fifty dollars ($50.00) and not more than five thousand dollars ($5,000.00) per day for each day of violation. Each day of violation shall constitute a separate violation.

(3) Measuring civil penalties. In assessing a civil penalty, the City of Lakeland (stormwater entity) may consider:
- (a) The harm done to the public health or the environment;
- (b) Whether the civil penalty imposed will be a substantial economic deterrent to the illegal activity;
- (c) The economic benefit gained by the violator;
- (d) The amount of effort put forth by the violator to remedy this violation;
- (e) Any unusual or extraordinary enforcement costs incurred by the city;
- (f) The amount of penalty established by ordinance or resolution for specific categories of violations; and
- (g) Any equities of the situation which outweigh the benefit of imposing any penalty or damage assessment.

(4) Recovery of damages and costs. In addition to the civil penalty in subsection (2) above, the city may recover:
- (a) All damages proximately caused by the violator to the city, which may include any reasonable expenses incurred in investigating violations of, and enforcing compliance with, this chapter, or any other actual damages caused by the violation.
- (b) The costs of the city's maintenance of stormwater facilities when the user of such facilities fails to maintain them as required by this chapter.

(5) Referral to TDEC. Where the city has used progressive enforcement to achieve compliance with this ordinance, and in the judgment of the city has not been successful, the city may refer the violation to TDEC. For the purposes of this provision, "progressive enforcement" shall mean two (2) follow-up inspections and two (2) warning letters. In addition, enforcement referrals to TDEC must include, at a minimum, the following information:
- (a) Construction project or industrial facility location;
- (b) Name of owner or operator;
- (c) Estimated construction project or size or type of industrial activity (including SIC code, if known);
- (d) Records of communications with the owner or operator regarding the violation, including at least two follow-up inspections, two warning letters or notices of violation, and any response from the owner or operator.

(6) Other remedies. The city may bring legal action to enjoin the continuing violation of this chapter, and the existence of any

other remedy, at law or equity, shall be no defense to any such actions.

(7) Remedies cumulative. The remedies set forth in this section shall be cumulative, not exclusive, and it shall not be a defense to any action, civil or criminal, that one (1) or more of the remedies set forth herein has been sought or granted.

VI. Section 18-607

1. Add the following new Section.

18-607. Appeals.

(1) Pursuant to Tennessee Code Annotated § 68-221-1106(d), any person aggrieved by the imposition of a civil penalty or damage assessment as provided by this chapter may appeal said penalty or damage assessment to the city's governing body.

(2) Appeals to be in writing. The appeal shall be in writing and filed with the municipal recorder or clerk within fifteen (15) days after the civil penalty and/or damage assessment is served in any manner authorized by law.

(3) Public hearing. Upon receipt of an appeal, the city's governing body, or other appeals board established by the city's governing body shall hold a public hearing within thirty (30) days. Ten (10) days prior notice of the time, date, and location of said hearing shall be published in a daily newspaper of general circulation. Ten (10) days' notice by registered mail shall also be provided to the aggrieved party, such notice to be sent to the address provided by the aggrieved party at the time of appeal. The decision of the governing body of the city shall

(4) be final. Appealing decisions of the city's governing body. Any alleged violator may appeal a decision of the city's governing body pursuant to the provisions of Tennessee Code Annotated, Title 27, Chapter 8.

ORDINANCE 12-183

AN ORDINANCE AMENDING VARIOUS SECTIONS IN TITLE 18, CHAPTER 6 PERTAINING TO STORM WATER MANAGEMENT AND POLLUTION CONTROL PLAN; PROVIDING FOR AN EFFECTIVE DATE

FILE COPY

BE IT FURTHER ORDAINED BY THE BOARD OF COMMISSIONERS OF THE CITY OF LAKELAND THAT:

This Ordinance shall take effect immediately after its passage on second and final reading, the public welfare requiring it.

First Reading:	November 1, 2012
Public Hearing	November 26, 2012
Final Reading:	December 3, 2012

Scott Carmichael, Mayor

ATTEST:

Sontidra L. Thomas, CMC
City Recorder